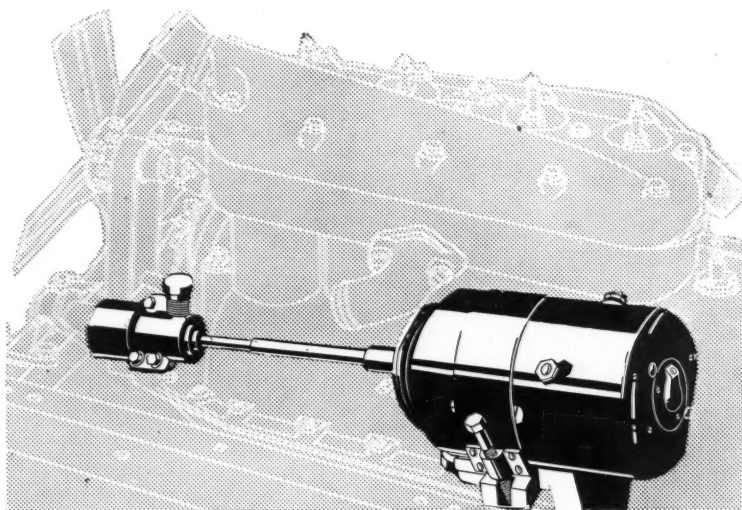


MOTOR AGE

Vol. XXIX
No. 16

CHICAGO, APRIL 20, 1916

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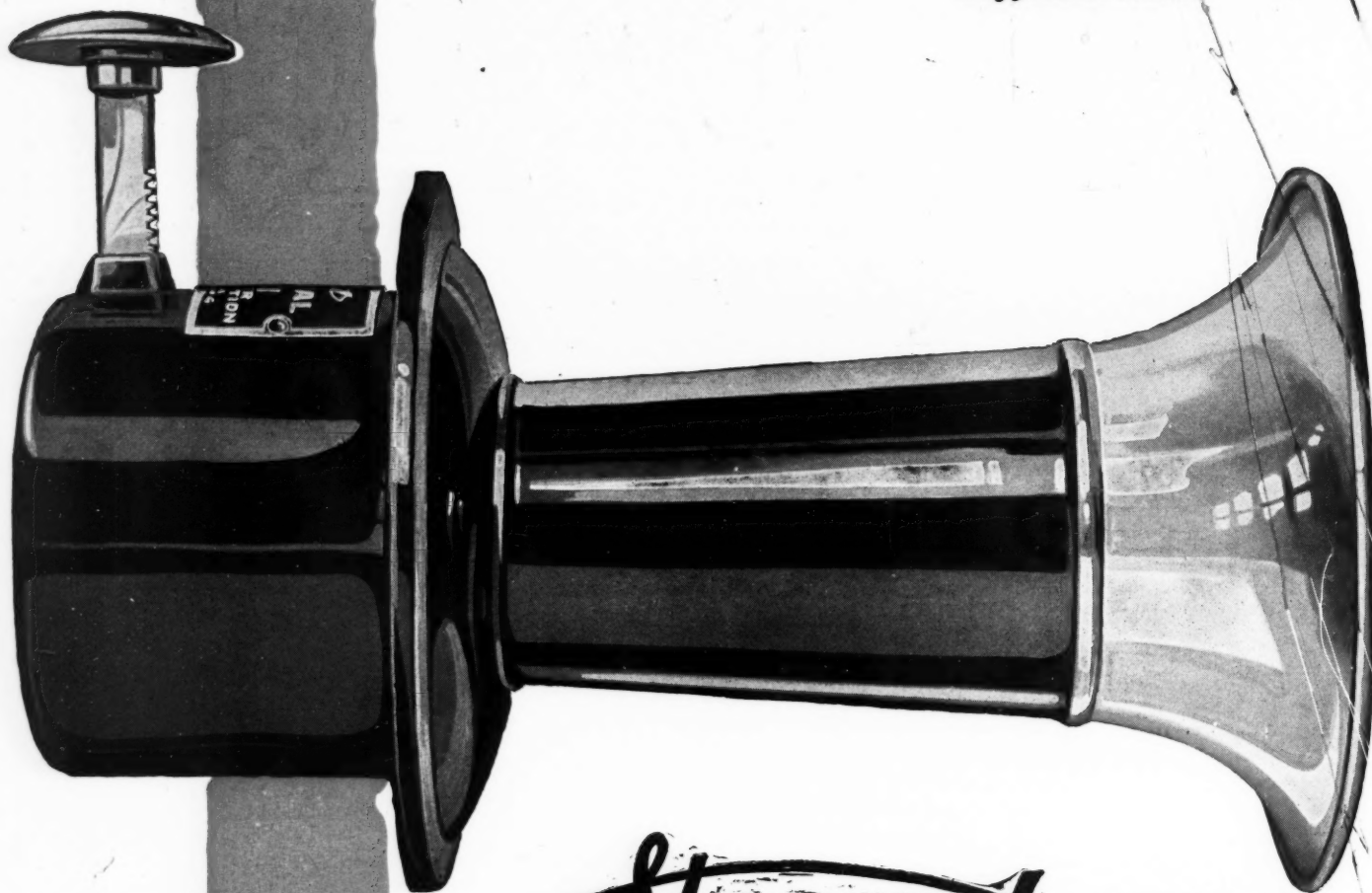


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April 20, 1916

No. 16

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ANNOUNCEMENTS

"Where the Car Comes From," the feature of Motor Age for April 27, will lead the reader into remote parts of the world and show in an interesting way from whence materials for making the different parts are brought to the plant. Your breakfast may be simple, yet your coffee may have come from Brazil, your toast from the Northwest, the sugar from Cuba, and your fruit from California. So it is with motor car materials; yet they all blend into a unit and seem always to have been together.

—BOY DRIVER CONTEST—

Because Motor Age's annual touring opening number has been postponed to the issue of May 18, the time of the Boy Driver contest has been extended to May 1. Manuscripts received until that date will be eligible for the \$100 in prizes.



The Dutch Girl Says=

"If you are not getting 3,500 to 5,000 miles of service from your tires, it is because you are not using discretion and DUTCH BRAND Products."

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Moisture entering the tire carcass through small cuts is one of the greatest tire destroyers. Neglected small cuts make big tire bills. The standard preventive is

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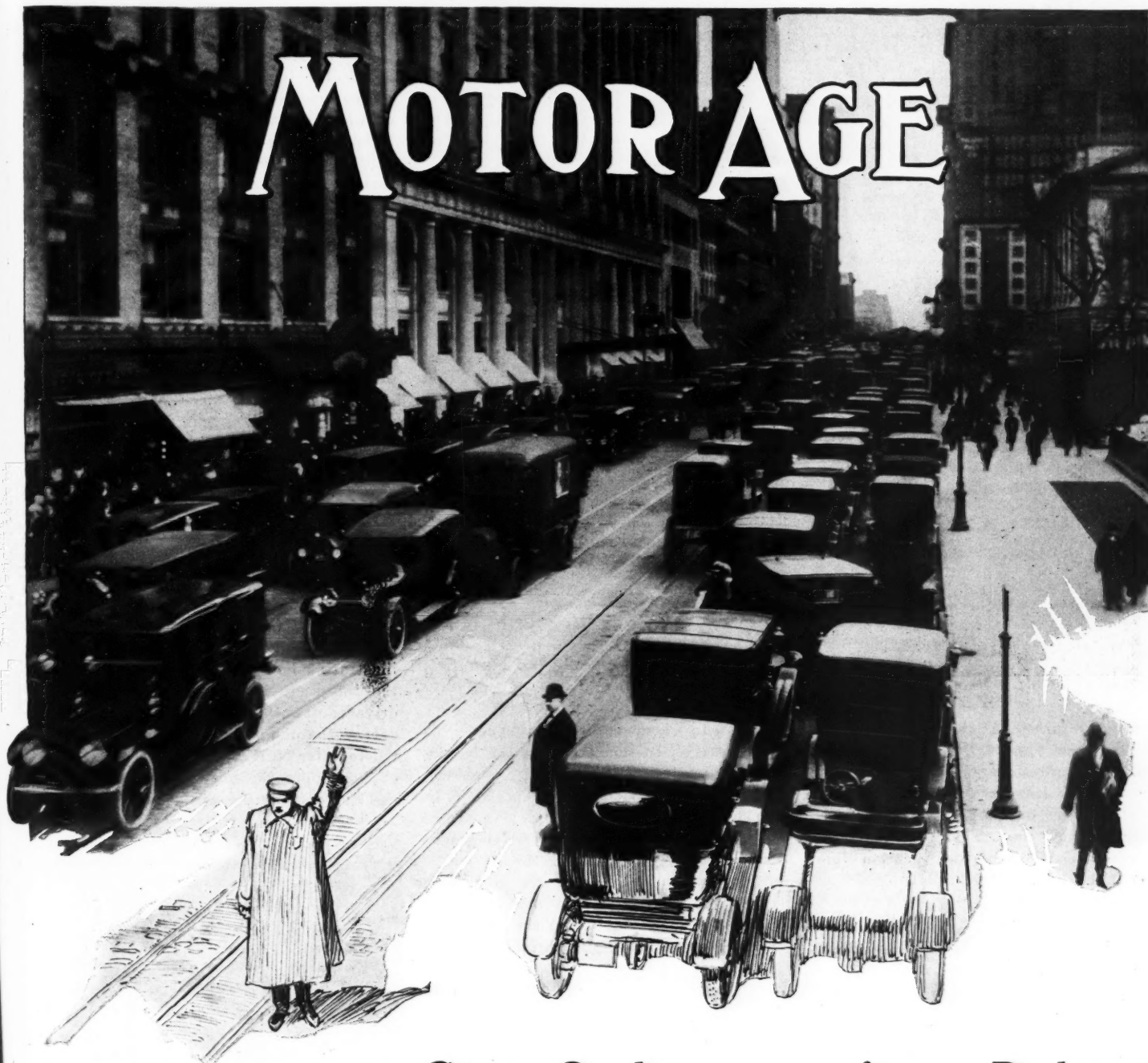
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MOTOR AGE



City Ordinances from Behind the Steering Wheel

The Motorist Away from Home Must Know Ins and Outs of Many Traffic Schemes

By Ralph E. Duncan

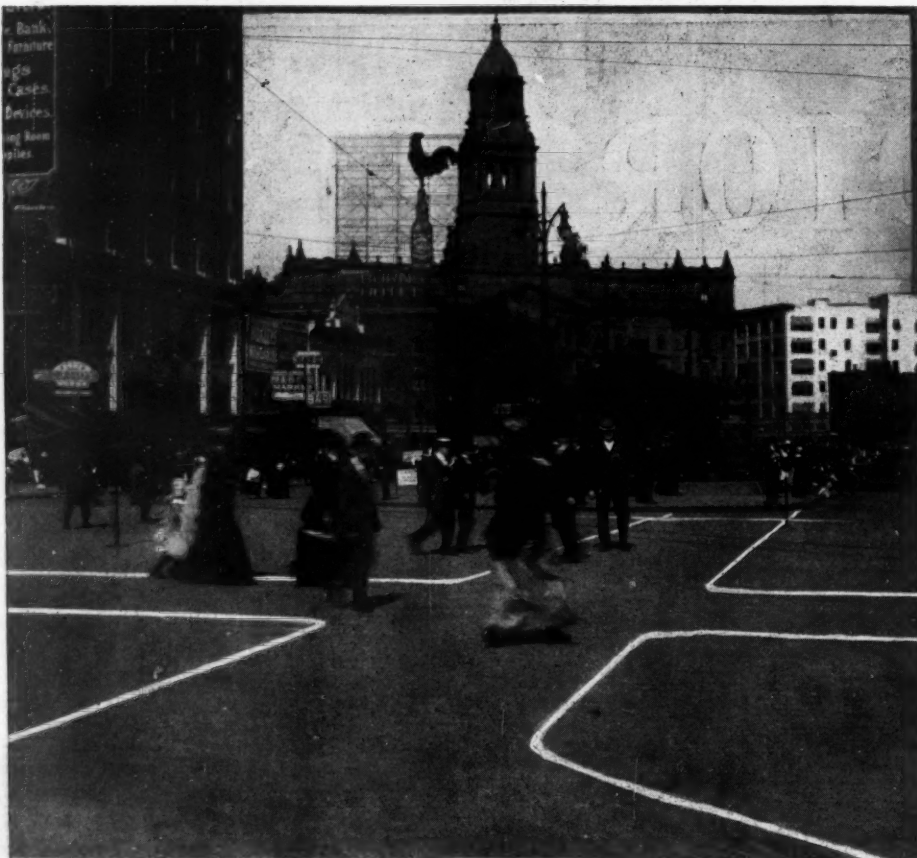
TRAFFIC officers have certain traits in common which cannot be overcome, one of these being an unwillingness to listen when motorists from out of town insist that the traffic ordinance of Homeburg, in the next state south, says so-and-so, and that the law ought to be the same in any other city. The visitor who becomes involved in a street-corner conference with the man in a uniform is apt to learn a few things about traffic laws that were never heard of back home, which may, or may not, mean that his home city is behind the times. A rule which he did not know was in existence anywhere may lead to all sorts of complexities and cause no little worry and inconvenience.

If the man from another city taxes the patience of the traffic officer with an explanation the latter has a summons ready for him, which is another prominent trait of men in his calling. And if the visitor

meant to depart from the city a few hours later, it makes no difference. Failure to acquaint himself with the traffic regulations of the city in which he happened to be has cost him the loss of a day's time in order that he might appear in court. The safe way is to send to every city one will visit on a trip away from home and obtain copies of the local ordinances.

It cost a motorist in Kansas City, Mo.,

\$10,000 to settle a damage suit brought against him by the owner of a motor car with which he collided. The defendant was a resident of Kansas City, but he was not aware that an ordinance exists in his city giving north and southbound vehicles the right of way when vehicles going east and west arrive at intersections simultaneously with those going north and south. In the case of a visiting motorist, possibly the jury would



How the safety zones are laid out in Detroit, Mich.

have returned a verdict for a smaller fee to which one is accustomed in his amount than \$10,000. At any rate it is well for non-resident motorists to know the rule in Kansas City governing the right of way—one might say it is imperative to know this and other traffic rules in every city where his vacation tours may take him.

Traffic Rules Tabulated

The important traffic rules of twenty-two cities have been tabulated by Motor Age with the co-operation of the chief of police of each city and the result is presented on other pages. Every motorist planning a tour this season should preserve the table and carry it with him for reference. If he is to be prepared with a copy of the regulations of the cities he will visit he must mail a request to the chief of police, the traffic bureau, or city clerk of every city which he expects to visit. The authorities of several cities have expressly requested motorists to adopt this course. It is common for residents of suburban towns to disobey the minor regulations, such as rules against parking in certain streets, one-way traffic in other streets, passing street cars on the wrong side, or stopping at a lawful distance behind street cars which have stopped to take on or unload passengers. The police argue that if suburbanites are in the class of chronic offenders it is not to be expected that the motorist from another state will make his way about with any less inconvenience to himself or the police unless he informs himself at the outset.

It is not safe to be guided by the traf-

home street. In some respects the regulations have been standardized. However, local conditions necessitate special ordinances quite frequently. In San Francisco, Cal., for instance, where steep grades exist in nearly all parts of the city, it is the custom to leave cars standing with either the front wheel or rear wheel in contact with the curb, and the car at an angle of from 30 to 45 degrees. This, of course, is a precaution against runaway motor cars. The city ordinances provide that this is the lawful manner.

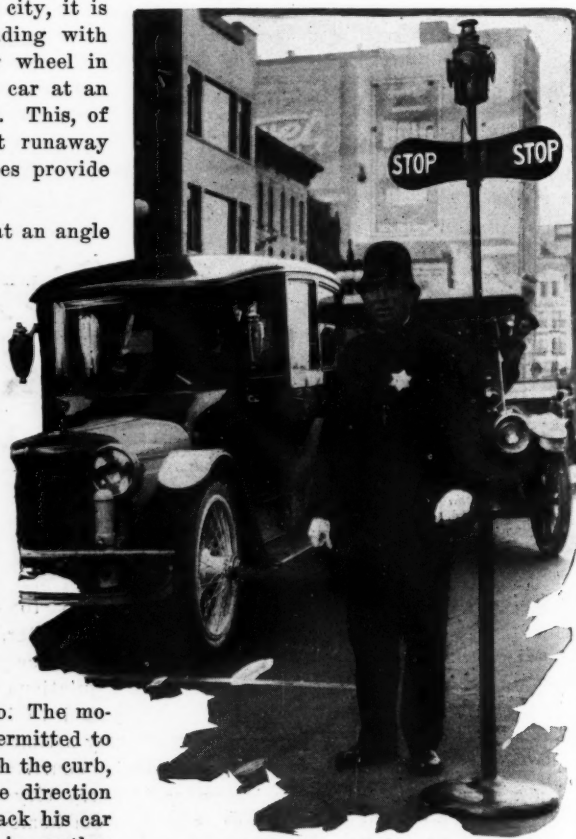
A few cities require parking at an angle with the curb whether grades are present or not. Among the cities where this will be seen are Dayton, O., Kansas City, Mo., Seattle, Wash., and Milwaukee, Wis. Elsewhere the ordinances specify that cars shall be parked parallel to the curb and facing in the direction of traffic. A lawsuit would uncover other points in some of these cities. The ordinances of Birmingham, Ala., require vehicles parked with front and rear wheels within 18 inches of the curb. Six inches less space is allowed in Denver, Colo. The motorist in New Orleans, La., is permitted to stand his car at an angle with the curb, with the machine headed in the direction of traffic. If he attempted to back his car against the curb in this fashion in another city he would straightway find himself in

a dispute with a traffic officer and on the wrong side of the argument.

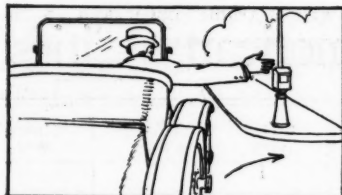
The question that probably arises most frequently in lawsuits under the traffic ordinances and statutes involves the right of way. To determine which of two vehicles have the right of way is often sufficient to decide a case. It is well, therefore, to give particular attention to the ordinances of different cities with regard to the sections covering that point. A diagram is printed herewith illustrating what is known as the rotary system at street intersections. It represents the junction of five streets in New Haven, Conn. The driver of a motor car approaching the intersection from any one direction, if he wishes to turn into the street at his left, must enter the circle of traffic, turning right instead of left upon coming to the cross walk, and going the long way around.

The Rotary System

Other cities have adopted the rotary system at almost all irregular street intersections. In San Francisco the main downtown thoroughfare, Market street, has streets running diagonally from one side and at right angles from the other direction. A diagram is herewith reproduced illustrating how the rotary system lies at the intersections of Market street. The driver approaching Market street around one of the diagonal streets is not permitted to enter Market street in the direction of his approach, but must turn to the right on the cross street and thence to Market street.



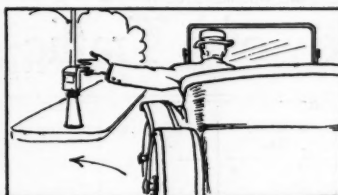
The familiar goo-goo sign



Signal 1—When stopping, if the steering wheel is on the right-hand side, extend the arm horizontally. This signal also means you are going to turn a corner at the right. The arrows in this and the accompanying sketches point in the direction of turning. These are the signals in most general use



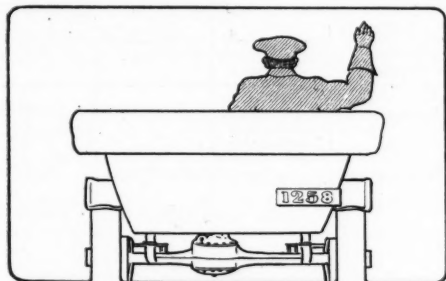
Signal 2—If you have a right-hand drive car and you want to turn a corner to the left, extend the right arm as illustrated and swing it in a circle about 2 feet in diameter in the direction indicated by the arrow. Swing it slowly and perhaps not more than three or four times



Signal 3—This signal is for a car with the steering wheel on the left side. The signal is to extend the left hand horizontally, which means either that you are going to stop or that you are going to turn a corner to the left. It is identical with signal No. 1, except that the other hand is used



Signal 4—This signal is for a car with steering wheel on the left and the signal is intended for the case in which you are going to turn a corner to the right. The left hand, as illustrated, is also slowly swung in a circle 18 inches or 2 feet in diameter, two, three, four, or perhaps more, swings



This drawing is reproduced from the traffic guide printed by the city of San Francisco, Cal. It shows driver's signal that he is about to slow up or stop

Elsewhere the rule is that the vehicle approaching from the right has the right of way. If the regulation is uniformly observed there should never be a doubt as to which vehicle must stop for the other. When two machines reach a street crossing simultaneously, the driver on the right hand is entitled to proceed. If a third motor car is coming at his right, he in turn must stop for the other driver. The following cities have adopted this plan: Cincinnati, O., Dayton, O., Denver, Colo., Omaha, Nebr., San Francisco, Cal., Seattle, Wash., and others.

Among cities which follow the idea illustrated by the Kansas City right-of-way regulation are Memphis, Tenn., except at intersections of boulevards, and New York City. North and south bound traffic is given the right of way. East and west bound traffic has the right of way in St. Louis, Mo.

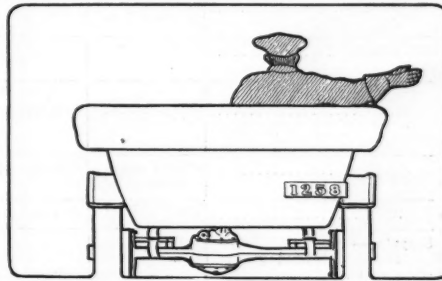
Parking Restrictions

Considerable inconvenience is caused daily in all large cities by the failure of motorists to pay heed to the parking restrictions in downtown streets. Cities are constantly experimenting to overcome the difficulties arising from this source. Parking privileges are limited to 15 minutes in a few cities. Boston, Mass., sets a limit of 5 minutes in certain streets and 10 minutes in other streets in the business district. The time restrictions vary from 5 minutes to one hour.

By referring to the table on pages 8 and 9 the rules in the various cities may be compared. Without exception the space in front of theaters in every large city is either reserved for vehicles receiving and discharging patrons of the theaters or for

taxicabs. Parking is prohibited before the entrances of office buildings also in the majority of cities. Most of cities, too, set aside certain streets in the congested districts where cars are not permitted to stand at any time, or between stated hours—when the tide of traffic is at its height morning or evening.

One of the questions put to the traffic chiefs by Motor Age was this: How can motorists in your city help in the improvement of the traffic conditions under the existing regulations? Captain A. L. Denman, chief of the traffic division of the Chicago police department, replied that motor car owners can aid the police most if they will avoid driving through the congested business centers of the city during the hours from 9 o'clock in the morning until 6 o'clock in the evening. Besides making quicker time on cross streets lying outside the business district, there is more safety in traveling the less crowded streets. Cross-town traffic in Chicago should follow Michigan boulevard, east of the loop district, or one of the outlying boulevards of the West Side.



Another illustration of the hand signals recommended in San Francisco is shown here. The driver is signalling that he is going to turn to the right

Similarly, in other cities, the police recommend that vehicles be kept out of the business and shopping districts unless required to go there. Particular emphasis is laid on this point by the Boston traffic code, the same city which limits parking to only 5 or 10 minutes. For his own comfort it is well for the out-of-town motorist to wait until the arc lights are turned on before he attempts to make a passage of any of the downtown thoroughfares.

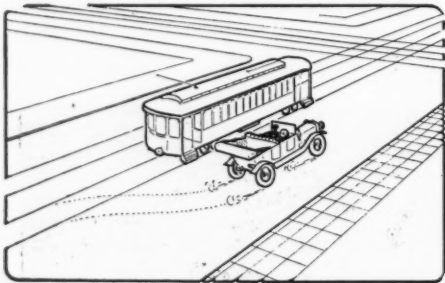
Tourists visiting New York City think they have not seen the town until they



The stream of traffic in the loop district of Chicago flows briskly at all hours

Reference Table of Traffic Rules in American Cities

	Albany, N. Y.	Atlanta, Ga.	Birmingham, Ala.	Boston, Mass.	Bridgeport, Conn.	Chicago, Ill.	Cincinnati, Ohio	Dayton, Ohio	Denver, Colo.	Detroit, Mich.
Speed Limits—										
Downtown		12 miles		8 miles		6 miles	8 miles	8 miles	10 miles	10 miles
Residence		20 miles	16 miles	15 miles		15 miles	15 miles	15 miles	15 miles	15 miles
Parks	8 miles	12 miles		Signs		15 miles	15 miles	15 miles	10 miles	
Schools, hospitals		10 miles				5 miles; churches during hours of service				
Crossings			8 miles	8 miles		7½ miles				
Signals—										
N. & S. proceed.....				Semaphores		Whistle: 2 blasts	Whistle: 1 blast	Semaphore	Semaphore	Semaphores
E. & W. proceed.....				Semaphores		Whistle: 1 blast	Whistle: 2 blasts	Semaphore	Semaphore	Semaphores
Danger				Warning by officer		Whistle: 3 blasts	Whistle: 3 blasts	Signal by officer	Officer's cane	
DRIVERS' SIGNALS—										
Stop	Hand vertical	Arm vertical	Arm signal	Arm vertical	Raise arm	Arm vertical	Arm vertical	Arm signals or mechanical device at rear	Arm vertical	
Turning	Visible or au- dible signals	Extend arm	Extend arm	Extend arm	Signal with hand	Extend arm	Extend arm		Swing of arm	
Slow	Hand vertical	Arm vertical	Arm signal	Arm vertical	Raise arm	Arm vertical			Arm vertical	
Stopping—										
Distance behind street cars		Stop	Stop	Stop	10 ft.	10 ft.	Stop	Safety zones		Safety zones
Distance from fire hy- drants		15 ft.					18 ft.	10 ft.	10 ft.	
Distance from corner....		10 ft. from street car crossing	25 ft. from st. 10 ft. from alley	10 ft.	10 ft.			15 ft.	60 ft.	75 ft. behind corner
Parking Regulations—										
Where prohibited	Theaters, stands	Designated sts. entrances of buildings	Designated sts. entrances of buildings			Designated streets	Designated streets	Signs		
Time restrictions.....										
Position at curb.....	Parallel	Parallel	½ hr., 18 in. from curb	5 and 10 min.	1 hr.	½ hr.	1 hr.	45° angle	1 ft. from curb	Parallel
Right of way—										
Direction	North & south except at boulevards				North & south		Vehicle on right	Vehicle on right	Vehicle on right	
One-way traffic	Designated streets					Alleys downtown				

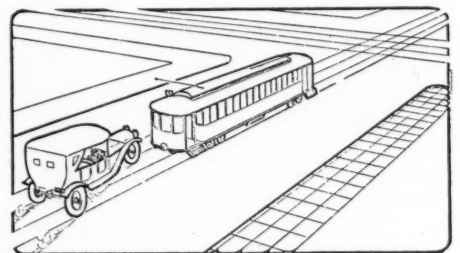


The right way to pass street cars is the safe way

have made a tour of Fifth avenue. Seeing Fifth avenue is therefore a popular

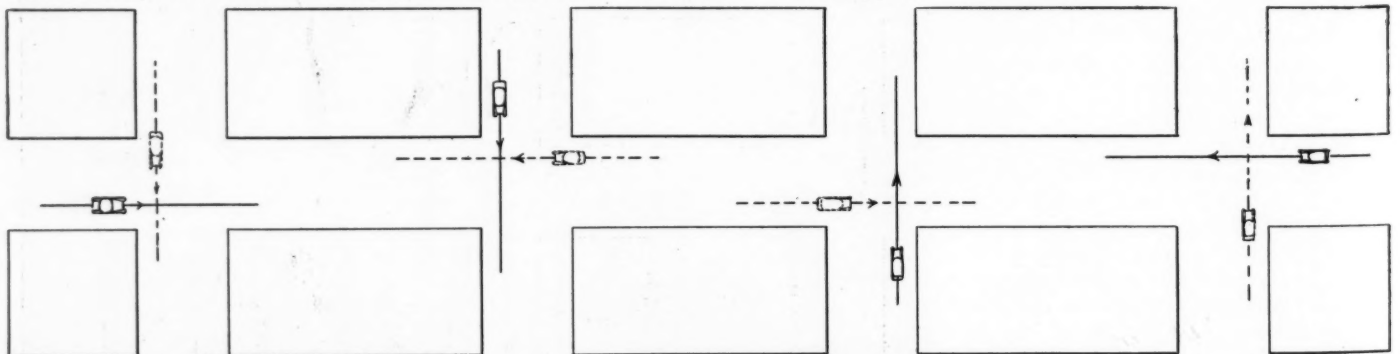
pastime, in spite of all that the over-worked traffic officers can do to discourage any unnecessary use of that thoroughfare.

In some New York streets cars travel in three continuous rows in both directions, and the driver wishing to turn into a side street at the left must manage his car as if he were on a moving stairway, where he has to step off and get his bearings afterward. He cannot turn across Fifth avenue without halting at least four and possibly six, lines of vehicles. To obviate delays of this kind, the method shown in the diagram is followed. The driver turns to the right into a cross-street, makes the circuit of the block, and



Passing a street car at the left, a violation of the law

joins the line of traffic which is moving across Fifth avenue in the direction he wishes to go.

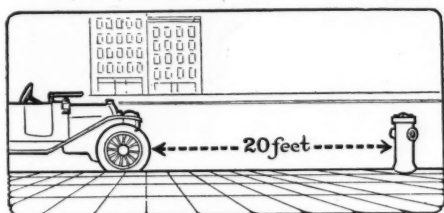


It is the rule in many cities that when two vehicles approach a street intersection simultaneously, in the manner illustrated, the vehicle at the right, as indicated by the heavy lines, shall have the right of way, regardless of the direction it is traveling

A First Aid to Motor Tourist—Preserve for Future Use

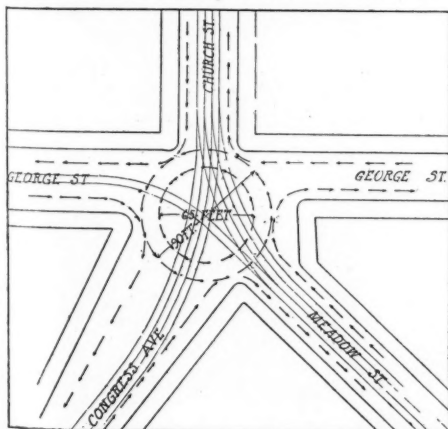
Kansas City, Mo.	Los Angeles, Cal.	Memphis, Tenn.	Nashville, Tenn.	New Orleans, La.	New York City	Omaha, Neb.	Philadelphia, Pa.	Richmond, Va.	St. Louis, Mo.	San Francisco, Cal.	Seattle, Wash.
15 miles	12 miles	8 miles	9 miles	10 miles		12 miles		8 miles		10 & 15 miles	6 miles
20 miles	Signs	15 miles	15 miles	20 miles		20 miles		15 miles		20 & 30 miles	20 miles
12 & 15 miles	Signs	8 miles	Signs	Signs		12 miles				Signs	12 miles
						Slow					
10 miles		7½ miles			4 miles	8 miles		8 miles			8 miles
Officer's signal		Whistle: 2 blasts	Whistle: 1 blast	Whistle: 1 blast	Semaphores	Direction of arm	Whistle: 2 blasts	Direction of arm	Direction of arm		Whistle: 1 blast
Officer's signal		Whistle: 1 blast	Whistle: 2 blasts	Whistle: 2 blasts	Semaphores	Direction of arm	Whistle: 1 blast	Direction of arm	Direction of arm		Whistle: 2 blasts
Electric gong		Whistle: 3 blasts	Whistle: 3 blasts	Whistle: 3 blasts	Whistle: 3 blasts	Warning by officer	Whistle: 3 blasts	Warning by officer	Warning by officer		
Arm vertical	Arm vertical	Arm vertical	Arm vertical	Arm vertical	Timely signal	Arm vertical	Arm or voice	Arm vertical	Arm vertical		Arm vertical
Extend arm	Signal to officer	Extend arm	Extend arm	Arm extended	Extend arm	Extend arm	Signal to officer	Extend arm	Extend arm		Extend arm
Arm vertical	Arm vertical	Arm vertical	Arm vertical	Arm vertical	Timely signal	Arm vertical	Arm vertical	Arm vertical	Arm vertical		Arm vertical
	Safety zones	15 ft.		Stop	8 ft.			Pass 8 ft. at side	Stop*		
10 ft.			15 ft.		10 ft.					20 ft.	
											Property line
Entrances of bldgs., 1 hr.	Congested streets	Congested streets	Entrances of buildings		Congested streets	Theaters, etc.	Signs	1 hr.	Parallel		Designated streets
Parallel	Parallel	15 min.	Parallel	Parallel or backed	Parallel	Right curb	Parallel			At angle†	30 min.
North & south except at boulevards	Vehicle on right	North & south except main streets		North & south	North & south	Vehicle on right			East and west	Vehicle on right	Vehicle on right
		Speedway		Designated streets	Designated streets		Designated streets		Designated streets		

*Exception.—Pass 6 ft. at side in congested streets †On 5 per cent grades and over



Cars must not be left near hydrants

A motorist may know the habits of street cars in his own city from A to Z. Yet

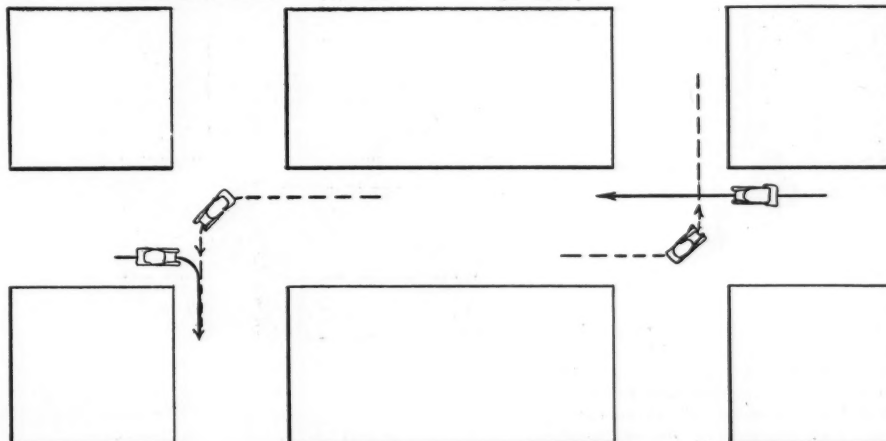


The rotary system of New Haven, Conn. All vehicles move around circle in same direction

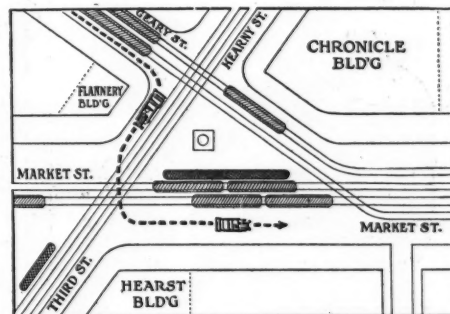
street cars and motormen in different cities behave in strange ways and not at all as the tourist might expect. The distance which motor cars are required to stop behind street cars while passengers are getting on or off, varies considerably, as shown in the table. In smaller cities it

(Continued on page 47).

If vehicle at right has the right of way, then, when one or more machines make a turn at a street intersection, the rule will govern them in the manner shown below, the heavy lines indicating which car shall proceed



The rotary system on San Francisco streets





Sitting down along the border should be done with caution

Hi Sibley-



Water bag on touring car. Camp car has 10-gallon milk can on running board



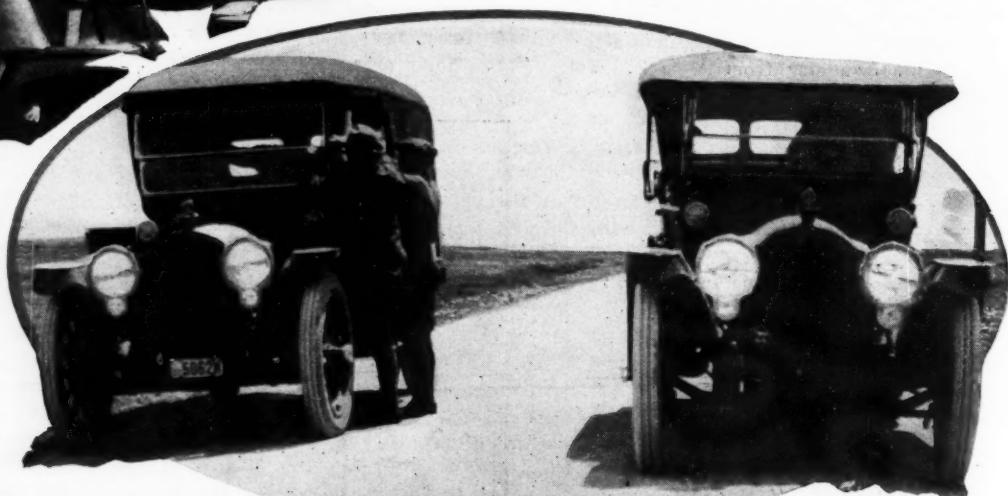
"Don't shoot till you see the whites of their eyes!" Mr. Joy trying out Mexican machine gun at Deming, N. M.



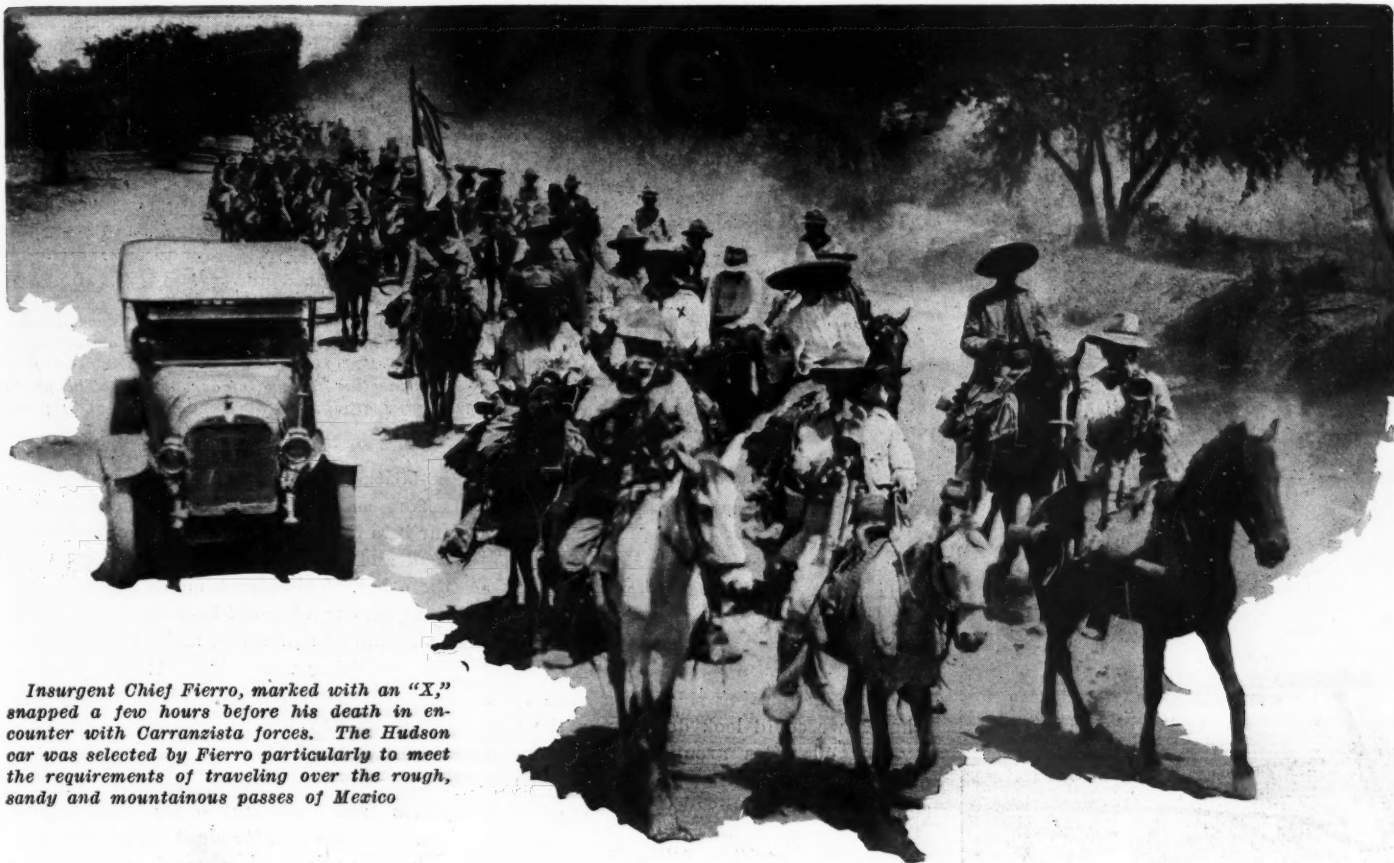
"Them cactus do grow horns!" McCulla operating on Morton



Mr. Joy with Mauser captured from Mexican in Columbus raid and holding puttee taken from dead bandit. Puttee has great hole shot through front. Captured Mexican machine gun mounted on hood. Mr. Snodgrass, proprietor Deming, N. M., garage in background



A stop en route, showing concrete highway for about 25 miles out of El Paso. Remainder desert sand and adobe



Insurgent Chief Fierro, marked with an "X," snapped a few hours before his death in encounter with Carranzista forces. The Hudson car was selected by Fierro particularly to meet the requirements of traveling over the rough, sandy and mountainous passes of Mexico

A Night on the Borderland

Details of a Trip from El Paso to Columbus, N. M.,
Across the Texas Plains

By Hi Sibley

DOWN on the Mexican border, for miles west of El Paso, is a vast sweep of desert of the dreariest nature. You speed through it on the train for hours, always with a desolate vista before you. Mile after mile, as far as the eye can reach, is nothing but a monotonous sand waste, sparsely dotted with discouraged and dusty vegetation, and at wide intervals a scraggy mountain rearing its vast bulk above this unpromising land. You do not see a living creature, nor is there a single habitation in sight.

Nature has done her darndest—and it was a thorough job—to discourage the pioneer. You will find no water, except perhaps an alkaline puddle that the tenderest of tenderfeet would shun, and there is nothing that even the omnivorous ostrich could eat. You could build a fire only with the greatest difficulty, for everything that burns is bristling with thorns and spines as sharp as needles. The sun beats down mercilessly from a perennially cloudless sky and there is not a sliver of shade. Why, you can't even find anything to sit down on unless it's a cactus or a rattlesnake. After one trial you prefer to stand up. The nights are like Arctic nights with their intense cold, and the deathly stillness, broken only by the creepy wail of a stray coyote, is maddening.

Even man, or rather a degenerate type of biped, has added his dread to this hopeless region. For months the notorious Pancho Villa, the mere mention of whose name sends shudders of horror down your spine, has roamed this border desert, committing the most horrible atrocities. They say he is forever driven out of this land; perhaps he is, perhaps he isn't, but at any rate his understudies are reported in this region almost daily, and they are as terrifying as their preceptor. Woe unto him who is lost in this fearful waste.

Say, how'd you like to camp there?
Yearned for Novel Environment

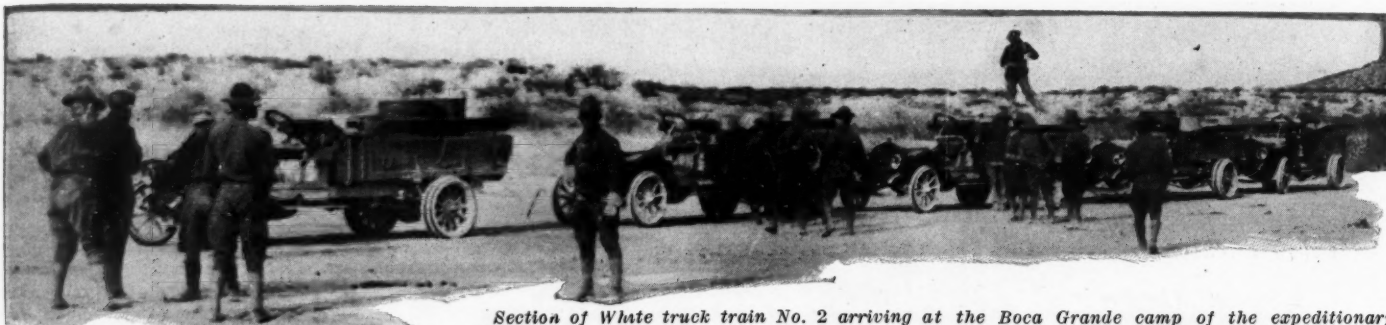
Well, that's what I thought, but it really is immense—if you do it right. I know four intrepid sportsmen who purposely selected this site for a picnic ground; they yearned for novel environment, and they most certainly got it. Yes, I was in the party, but not as an intrepid sportsman, rather on the order of a shivery historian, after hearing some of the gruesome tales about the Mexican bandits of that country.

I've tried to describe what an unalluring slice of geography this district is, and yet, in spite of the entire absence of physical attractions in our camping ground, we lived as luxuriously as in a city hotel.

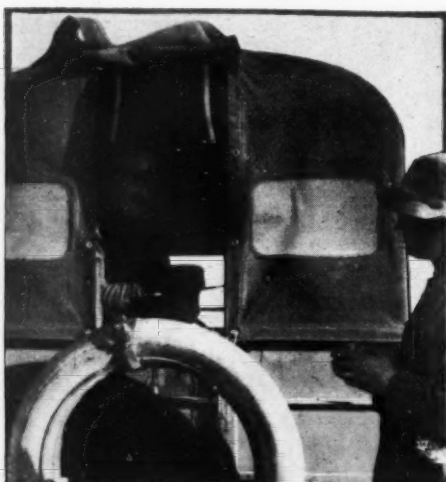
"Poof!" and again "Poof!" for the desert, said we, though I will admit our "poofs" for stray bandits were not so audible. We had a sumptuous dinner, served in courses and piping hot; our breakfast surpassed anything I've eaten down here since I left Chicago. Two of us slept in berths as snug as those of a Pullman, the other three in sleeping bags on the sand, and as far as our personal comfort was concerned, the rest of the world could go hang.

You see, we had a camp car that was the last word in camp cars. Our host, Henry B. Joy, president of the Packard Motor Car Co., designed it himself, and having had much to do with, in, on and about camp cars for many years, he knew what was desirable, and more important, what was not, in one of these portable homes. There were no elaborate and useless fixtures and every bit of equipment had its individual use and was used. Nothing was lacking.

Briefly, a light type of khaki-colored prairie schooner body is mounted on a standard Packard twin-six chassis. The outside is not encumbered with tools and this and that; on the running boards are only the standard tool boxes, and two 10-gallon milk cans for water and gas, respectively. Two extra tires are carried on



Section of White truck train No. 2 arriving at the Boca Grande camp of the expeditionary force in Mexico. These trucks have proved invaluable in carrying supplies, mail, ammunition, etc., to the base camps in Mexico from Columbus, N. M. It will be noticed that the first truck carries huge containers which are filled with gasoline for use of aeroplanes. The photo also gives an excellent idea of the nature of the country around Boca Grande; the sandy plain and stunted herbage of the rolling dunes



Mr. Joy cooking breakfast on alcohol stove in camp car

the left side, two on the rear rack, and on the right side is strapped an ax. Inside is carried an astonishing amount of equipment, but one does not get this impression, for everything is so cleverly fitted together that the interior is as neat as the inside of an empty new delivery wagon. At the rear is a two-burner alcohol stove with oven, and beneath the roomy bunks along each side are drawers and lockers for the utensils, food and general equipment. There are no jangling doodads suspended from the ceiling, and two emergency oil lanterns securely attached to the top bows are all that break the smoothness of the interior. But the oil lanterns are rarely lighted, for this snug home is illuminated by two electric ceiling lights.

Our party, composed of Mr. Joy, William R. McCulla, C. E. Morton, Ernest Eisenhut, all of the Packard factory, and myself started from the Hotel Paso del Norte in El Paso at noon with our camp car and a standard twin-six, seven-passenger touring car. Our destination was Columbus, N. M., from whence these men intend to make a trip into the interior of Mexico to observe the work of Packard trucks in army service.

For the first 60 miles we followed the border over roads that stretched out to the sky-line as straight as a taut string. Gen-

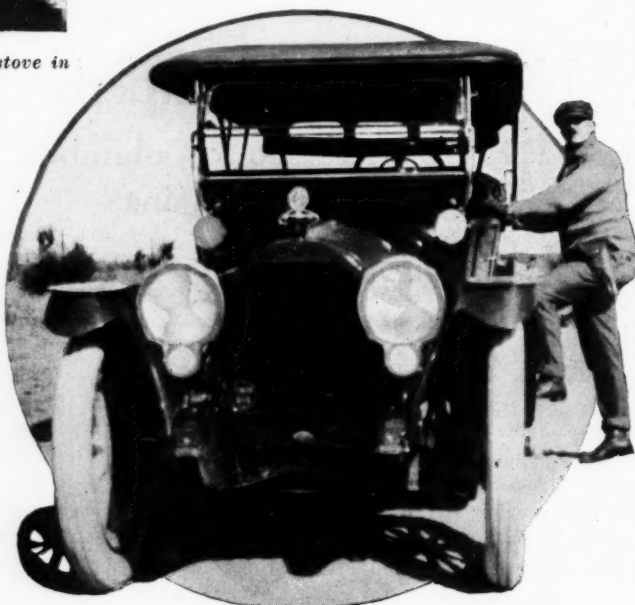
erally they were good roads, concrete part of the way, but mostly sand and adobe. The sand was rarely deep, or drifted on the road-bed, and it was like riding on velvet when those big Packards laid back their ears and breezed along as though their only ambition was to catch up with the horizon. At one place we mounted up and up on an undulating ridge to a mesa from whence we could look down upon the valley for 40 miles around, but it was a dreary valley, with not a blade of green in sight. Incidentally, we passed through

in latitude and longitude. Presently, just before sundown, Mr. Joy nosed the pilot car into the cactus and mesquite beside the road and Mr. Morton drew alongside with the other. This struck me as a pretty fair location, for a big old he-mountain towered up beside us and would make a good break for the rising west wind. It didn't occur to me at the time that that mountain was 20 miles away.

While Mr. Joy and the industrious "Ernie" were opening cans and rattling plates and making other encouraging sounds attendant upon the preparing of a meal—most of us hadn't eaten since breakfast—we other three started to build a campfire. We didn't need it to cook by, but had to have one if only to follow precedent. Building a fire on the desert is no small chore. There being no fence posts handy, you have to depend on such vegetation as you find, and I have told you how prickly that is. Everything you touch has some sort of hidden stinger laying for you. The thorns on a mesquite bush, which are sharp enough and hard enough to be used successfully for Victrola needles, are sufficiently evident to be avoided, but some of the harmless-looking shrubs literally are covered with an invisible little spine that starts into your gloves and keeps on working through until it is half way into your hand, and even then it doesn't stop for the whistle. After we

got together about enough brush to light a pipe, if it wasn't a big one, we laid off and by common impulse gravitated toward the camp car, from which emanated most savory odors of steak and tea and soup and things.

We hung around outside and sniffed so earnestly that Mr. Joy said, "Ernie, hand me that gun—there is a pack of wolves out here." And he was far from being wrong. We were on the point of taking off a couple of tires to munch when dinner was announced, and the enthusiasm with which we gulped that scalding soup and luscious steak was fascinating. When you have a



In very heart of the desert. "Army" about to resume wheel. Through this section we averaged 45 m. p. h. in sand and against strong head wind

only one fertile region and that was irrigated, but there was no exotic verdure like one sees everywhere along the Great Lakes in summertime.

One Square Mile Like Every Other

In order to avoid impassable roads we struck northwest toward Deming, N. M., at the half-way point, thereby adding some 20 odd miles to our trip. At Deming we tarried long enough to take on gas and to inspect some trophies captured from the Villa bandits, and then plunged into the desert again to seek our camping ground. There was little choice, for one square mile was just like any other square mile, except



desert appetite and something for it to do, you envy no man.

After supper we sat around our puny campfire and smoked and talked of—bandits. It was a ticklish subject. Over that very road Villa had ridden with his murderous crew. A rancher had been found dead within a few miles of that very spot, his wife mortally wounded. For all we knew, there was not a white man within 10 miles to whom we could call for help if we were attacked, and that was not unlikely. Five dead gringos and two fine motor cars would be a good night's work for any greaser. I recalled hair-raising tales of atrocities I had heard at Columbus, and from eye witnesses. Even there in town, with the protection of the troops, one felt sort of weak in the pit of the stomach.

But out here—gosh, it was so still and so dark beyond the light of our fire! During lulls in our desultory conversation we sat with an ear cocked in the direction of the great black beyond, but it was rewarded with not a sound. Just before retiring, "Army" did hear a distant noise, half buzz and half rattle. At first we thought it might be a rattlesnake getting ready for bed, but finally concluded it came from the single telegraph wire strung along the road. As the fire died out and our eyes grew more accustomed to the darkness we could discern shadowy forms in an irregular circle about us; they were motionless, like bandits getting ready to spring. All of you know how a bandit looks when he is getting ready to spring. I could even make out the gun that one of them carried. I fingered my pistol. Suddenly some one snapped on the headlights of the camp car and the ominous circle of cut-throats dissolved into mesquite and desert palms.

At 10 o'clock we prepared to turn in. There was a lively click and snap as the deadly pills were shoved into the 45-automatic magazines, the rifle loaded, and the ax placed in a handy position. "Army" loaded his big Mauser pistol that looked as destructive as a machine gun, tucked it under his blanket roll and stretched out on



Found on road in early morning, just as snapped. One-armed chauffeur taking nap in road while faithful Ford stands guard. Chauffeur dead drunk and 10 miles from nearest house



Awake with the chickens—only the chickens in this case happened to be rattlesnakes, for they were the only living creatures for miles around. Snapped soon after sunrise. Mr. Joy just getting out of sleeping bag



Tire ticklers. Taken just as car stood

one of the camp car bunks. By request, I took the other bunk, while with much preliminary grunting and facetious comment, Mr. Joy, "Mac" and "Ernie" crawled into their snug sleeping bags outside on the sand, and in three winks all was quiet except for the sonorous breathing of certain members of our party.

What phantoms came to taunt the others in their sleep I could not say, but I know that a score of particularly evil-looking greasers on horseback stealthily crept up on me. Nearer and nearer they came, until I could make out their monstrous guns, and finally the leader, a swarthy giant with a vicious face, spurred his horse and bore down on me at a mad gallop, and just before I was trampled to death I woke up. There was a husky elbow in my ribs. I followed up that elbow and discovered that "Army" was on the other end of it.

"Wha—what's the matter?" I stut-tered.

"Matter? Say, how'd you expect me to hear anything outside when you're sawing railroad ties all night? I don't mind your plain sawing, but this fancy work, when you strike a rusty spike every 10 seconds—why, there might be a thousand

yelling Comanches out there for all I'd know. Try sleeping on your side."

I did, but it was sometime before I got to sleep. It came at last, however, and the next thing I was conscious of was the early morning sun shining in my face. We all were up at 6, very much refreshed, and in high spirits. We found no bandit tracks around the camp; no coyotes or rabbits or other wild beasts had carried off any of our property, and we were full of the joy of living, particularly when the coffee began to sizzle over the stove. After a breakfast which would have done credit to any hotel, we got out the auto-matics and tried a little target practice. "Mac" established a reputation by clipping off the slender twig that supported the can we were shooting at with his first shot, but he ruined it by firing half a dozen without effect. The bullets whined off across the desert and probably fetched up against a mountain.

Died on the Plains

Just before we started we heard the chug of a missing motor far down the road, and as it came opposite us its engine laid down and died completely. We heard sounds of an argument, and mighty ugly

sounds they were, and it developed that a number of soldiers had hired a car to take them from Deming to Columbus, but they showed poor choice in the selection of a chauffeur, for he was maudlin. Presently they got the car started again—but not until the crazed driver had torn off the windshield and dashed it into the road—and they zig-zagged past us perilously at top speed, the driver still cursing at the top of his voice. After we had started, further along, we found the car across the road, evidently abandoned by the soldiers, with the driver asleep under the front wheels. And what was more shocking, he had an artificial arm.

It was 9 o'clock when we sped into bullet-ridden Columbus, tanned and dust-covered, but as exuberant as a crowd of school boys. We went directly into the military camp, where the cars were objects of great interest, and where Mr. Joy and his party were enthusiastically greeted by Captain Blake, of the quartermaster's department, and the boys of the Packard truck trains.

It was a great treat, that trip, and the only time I ever slept in the open that I didn't hear a rooster crow in the morning.



Car equipped to make preparedness tour

Crossing Country in Preparedness Campaign

Massachusetts Man Armors His Car and Starts Out to Arouse Public

BOSTON, Mass., April 15—William H. Forrest, a member of the 8th regiment, Massachusetts militia, has started on a transcontinental trip in an armored car as a plan to aid the preparedness movement. He took his Reo the fifth car, and had it turned into an armored scout machine using 1,800 pounds of No. 8 armor.

There is room in front to use a machine gun. Another one can be mounted in the rear. The front is so arranged that the driver and another man may sit in the

front compartment and operate the car and the gun. There is a periscope in front so that the driver's compartment may be closed from attack and yet allow the machine to be operated.

In the rear there is a compartment for another gun, and the sides may be thrown up for shields, or when not in action lowered so as to form a cover for the contents and the gun. The car can carry 10 days' rations for its crew in addition to the ammunition.

The wheels each weigh 165 pounds, and Lee tires are used on them. The chassis weighs 2,850 pounds. Mr. Forrest will spend 112 days on the trip covering 11,200 miles. He goes by way of Albany, New York, Washington, Philadelphia, Pittsburgh, Indianapolis, St. Louis, Denver, Los Angeles to San Francisco, returning over the Northern route. The car was designed by Mr. Forrest and W. G. Renwick, chief counsel of the Massachusetts State Automobile Association.

Prepare for Mobilization of the Country's Motor Trucks

N. A. C. C. Taking Census of Private Vehicles Available for Use of Army if Needed

WASHINGTON, D. C., April 17—Special telegram—Military preparedness received a decided impetus today when an important conference between representatives of the motor car industry and railroad interests and members of the War College division of the chief of staff of the army took place at the War College. The conference, which was of a preliminary character and which was not open to the public, will be followed by meetings of like nature during the next few months. Alfred Reeves is reported to have informed the army officers of work that already has been started in way of compiling information as to number of privately-owned motor trucks throughout the country. Coker F. Clarkson and Russell Huff also are reported to have given army officers valuable information that will be of aid in working out the transportation problem in case of emergencies.

Others who participated in conference were Howard Coffin, S. D. Waldron, Henry Souther, George C. Diehl, A. G. Batchelder, S. A. Miles, John M. Wilson, B. Sweet, Fairfax Harrison, president of the Southern Railway, W. G. Beseler, president of the Jersey Central Railroad, and R. H. Aishton, vice-president Chicago & North Western Railway.

The conference was presided over by General McComb. Fourteen other army officers were present.

N. A. C. C. Works for Preparedness

New York, April 15—The National Automobile Chamber of Commerce is going to assist the United States Government in military preparedness and has authorized Alfred Reeves, its general manager, to create a special department for this work. Mr. Reeves has already started to lay plans for the collection of information on motor trucks owned by private citizens throughout the country. The work will largely consist in compiling information on the numbers of different trucks in different cities throughout the country, so that in case of emergencies these trucks can be called upon for government use and dispatched to any particular point without loss of time.

This new work of the N. A. C. C. will be formally opened at a luncheon at the War College Monday, April 17, when Mr. Reeves and representatives of the different railroads and other transportation interests will discuss the matter with war college officials under General McComb. The plan is to co-operate with the government in co-ordinating all of the transportation interests in the country. It is not enough that a plan for speedy mobilization of motor trucks in the different states be agreed upon, but it is essential that mo-

tor truck transportation be co-ordinated with railroad and perhaps steamboat service, so that the last word in efficiency would be possible in case of emergency.

The work of interesting the N. A. C. C. in this preparedness program has been carried on by Howard Coffin, who is a member of the naval consulting board and is devoting a great deal of time to this work. Mr. Coffin has discussed the question of motor truck military transportation with the War College and as soon as the N. A. C. C. authorized the creation of a department for this work, the War College accepted the plan and issued invitations for the luncheon.

It is expected that the Society of Automobile Engineers will co-operate in this work insofar as engineering questions are concerned. The S. A. E. council went on record some months ago as being in favor of co-operating with the government on questions of preparedness. Its work will naturally go hand in hand with that of the N. A. C. C.

Besides compiling information on the number of motor trucks in different cities as well as their capacity it is expected that the N. A. C. C. preparedness plan will include a country wide organization plan for the possible mobilizing of these vehicles into different divisions, sub-divisions, etc., so that should emergency arise the entire plan will have been perfected and nothing will remain but the putting into service of the vehicles.

The plan further contemplates arranging of these trucks in convoy order according to makes so that in an exigency it will be possible to form a convoy in any section of the country of thirty or forty trucks of the same make. This method

of convoy formation has proven most effective in Europe.

It is further planned to arrange with factories for supplies of spare parts. The actual shipping of these parts will not be carried out but unquestionably an inventory of spare parts carried in different parts of the country will be included.

The plan further embraces the organization of factory repair crews, in the different truck factories. These crews could be organized and ready for transportation at short notice to any state in the Union. The plans include the possibility of organization within these crews to increase their effectiveness.

STUDEBAKERS TO RUSSIA

Detroit, Mich., April 13—Fifteen Studebaker sixes, all 1916 models, equipped for service as ambulances in the Russian army, are to be sent to Russia April 20 by the American Ambulance in Russia, which, within two months, raised funds enough for the complete purchase of this flotilla and its equipment.

On April 10 the ambulances formally were turned over to Consul General Oustinnoff after they received the blessing of Archbishop Evdokim of the Greek Orthodox Church of North America.

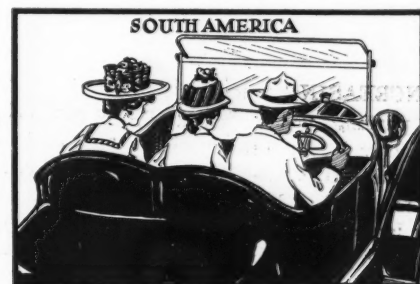
The ambulances will be in charge of Dr. Phillip Newton, who holds a general's commission in the Russian army, bestowed upon him by the Czar for his services with the Russian army under fire. Dr. Newton came to this country about 2 months ago to raise funds for this flotilla, which will include two repair cars, one pilot car, a hospital car with tent, and twelve ambulances. These ambulances will be equipped with four stretchers.

The Thick and the Thin of It



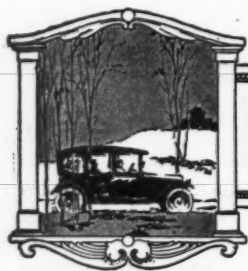
LANSING, Mich., April 15—An ingenious reply has been received by the Olds Motor Works to its recent appeal for help in meeting an inquiry from South America for "a two-seater car to seat three, a three-seater to seat four, and a four-seater to seat five."

The correspondent, whose address is "somewhere in Missouri," suggests the

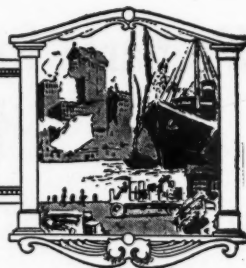


following as the reason for the request.

"On account of climatic conditions, the natives of South America are not as hefty as inhabitants of the U. S. A., so they logically figure that a car built for two North American corn-fed beauties will easily accommodate three lesser-developed South Americans, and so on down the scale."



EDITORIAL PERSPECTIVES



Exit the Headlight Glare

THE glaring headlight must go not only in one state but in every state in the union. Not only is it a nuisance but it is a real danger on the highways. Not only is it a real danger but it is a needless danger. It is a needless danger in that the glaring rays rarely contribute directly to the rays that illumine the highway surface, rather they are the rays that illumine the branches of overhead trees, doing little real good. It is a fallacy long since exploded that you cannot illumine the road surface 150 feet in advance of the car and not have any glaring rays. One or two states have demonstrated for months that it can be done and done in a variety of ways, and at a very nominal expense.

THERE are on the market today many anti-glare devices that are more or less dangerous, perhaps nearly as dangerous as the glaring rays. Some of these devices cut down too much the volume of light falling on the road surface, and instead of being able to pick up objects on the road at a distance of 150 feet, you have difficulty in picking them up at 75 feet. Such anti-glare devices are dangerous, for 75 feet is not a sufficient distance.

The Radiator Tonic

NOW is the time to give the radiator its annual spring tonic. Last fall you filled it up with anti-freeze solution and during the winter added mixture as needed. Now give it a good flushing. Draining the radiator and jackets is not sufficient, unless you keep the engine running and fill the system several times. You can then judge as to when the job has been well done by the color of the water draining from the radiator. It is a good plan, if not too difficult to do on your car, to uncouple the hose connecting the radiator base with the waterpump and attach the water hydrant direct and keep the engine running. This gives an entire supply of fresh water and does the job thoroughly as well as quickly. The inside of the radiator becomes coated as does the inside of the cylinder jackets and a good flushing every month or so in the touring season is beneficial. This is all the more essential in days when you are doing everything possible to cut down gasoline consumption, as every little thing done to make the car as a total run better lowers the consumption of fuel.

City Parking Spaces

INCREASING numbers of motor cars bring up the problem of parking cars in down-town and business sections while the owner is in his business office. In many cities there are too many cars already to permit of the business man leaving his machine at the curb in front of his office for 4 or 5 hours at a time. In our largest cities the parking question has been up for many years and hundreds of car owners, who would like to drive to work in their machines, are compelled to leave them at home because there is no parking space by the curb in front of or near their offices. This situation is extending to other cities of considerably less population and already has become sufficiently acute to lead the city authorities actively to take up the investigation.

THE state of Maryland has recently passed a law which becomes effective July 1 and under which cities are given the right to set aside certain places as municipal parking zones and

EVERY anti-glare device which eliminates the glare and yet does not cut down the volume of light falling on the road surface meets practically 95 per cent of the requirements of a good anti-glare. It is essential that there be enough light along the side of the road to avoid striking pedestrians. Some states require that a good light must shed enough rays on the side to pick up a pedestrian who is ten feet in advance of the car and ten feet to the side.

IT is fortunate that during the past sessions of state legislatures few radical anti-glare ordinances have been passed, and those passed have not specified any particular type of anti-glare, but rather the solution of the problem has been left to the different makers and to the car owners as well. This has been largely due to energetic motor organizations that have held headlight demonstrations at which state officials have been present. These demonstrations have been thoroughly practical and have on numerous occasions demonstrated the fact that the anti-glare device that in addition cuts down the volume of light falling on the surface is dangerous and should not be permitted.

The Top Slip Cover

IT is poor investment not to regularly use the slip cover that goes over the top of the touring car when folded down. This slip cover greatly improves the appearance of the car, but it serves other uses. The life of the top is increased by its regular use and the comfort of the passengers is also served by its regular use. Where the slip cover is not used the top inside gets filled with dust and when it is raised this dust gets into the eyes of all the passengers as well as falls on their clothes. It is unpleasant to have dust from a top getting into passengers' eyes.

TOO few car owners are particular enough in folding the top when putting it down. The folds of material get between the top bows and often are destroyed. With some tops it is essential that all folds be kept from between the bows. This not only lengthens the life of the top but keeps it in better condition. Too often the top becomes shabby in a few months, whereas if it were given a little care its appearance could be kept longer.

to make a nominal charge for machines parked therein. The city of Chicago has had the question up for some time and has been using a section of a down-town park for garaging cars during the daytime.

THAT the street is not the correct place to garage a car all forenoon or all afternoon has been recognized. Where traffic is not too seriously interfered with it is still permitted and correctly so, but so soon as curb parking interferes with the normal use of the street then it is opportune to consider other places for parking the machine used by the business man to go to and return from his work. By creating small parking spaces within convenient distances and charging a nominal fee for same a specific good is being done and no motorist should object to paying such a nominal sum. There are hundreds of garages that might make good money out of day garaging of this nature.

February Exports Show 250 Per Cent Increase

Comparison with Corresponding Month of 1915 Reveals Big Gain

WASHINGTON, D. C., April 15—Exports of commercial and passenger cars and parts for February, 1916, were nearly 250 per cent in excess of the exports for the same period of 1915. The comparison between the two periods is shown by the following tabulations:

FEBRUARY, 1916, EXPORTS

Type	Number	Value
Commercial	2,063	\$ 6,170,367
Passenger	5,651	4,063,429
Parts*		2,173,409
		\$12,407,205

FEBRUARY, 1915, EXPORTS

Type	Number	Value
Commercial	1,002	\$ 3,022,482
Passenger	2,230	1,785,330
Parts*		564,076
		\$ 5,371,888

* Does not include engines or tires.

Exports for the 8 months ending February, 1916, also showed a big increase over the same period a year ago, the figures follow:

EIGHT MONTHS ENDING FEBRUARY, 1916

Type	Number	Value
Commercial	14,467	\$38,729,721
Passenger	33,256	25,534,507
Parts*		14,965,360

EIGHT MONTHS ENDING FEBRUARY, 1915

Type	Number	Value
Commercial	4,974	\$14,001,924
Passenger	9,134	7,593,429
Parts*		3,354,222

* Does not include engines or tires.

The warring countries in Europe are largely responsible for the large gains that have been made in the motor car export trade. Russia is branching out as a buyer of American machines, 335 of them, valued at \$1,514,729, having been shipped there in February last, while during the 8 months' period of 1916, the shipments reached a total of 4,568 machines, the value of which was \$14,338,776. Russia did not figure in the export tables last year.

United Kingdom Heads List

Naturally, the United Kingdom continues to head the list of countries importing American cars. The figures show that in February last 1,169 cars, valued at \$1,763,079 were shipped to the little island, while during the 8 months' period the number was 14,740 and the value \$20,377,746. This is a big gain over the figures for the same periods of last year, when 1,183 cars, valued at \$1,688,313, were exported in February and 4,631 cars, valued at \$6,447,015, during the 8 months ended February.

France, too, continues to receive large shipments of American cars, 1,027, valued at \$2,804,931, being exported there in February, 1916, as against 412, valued at \$1,389,599, shipped in February a year ago. For the 8 months' period the exports rose from 2,436 cars, valued at \$6,407,087, in 1915, to 4,199 cars, valued at \$10,798,226, in 1916.

There were no shipments of cars to Germany in February last or during the 8 months' period of this year, but during the

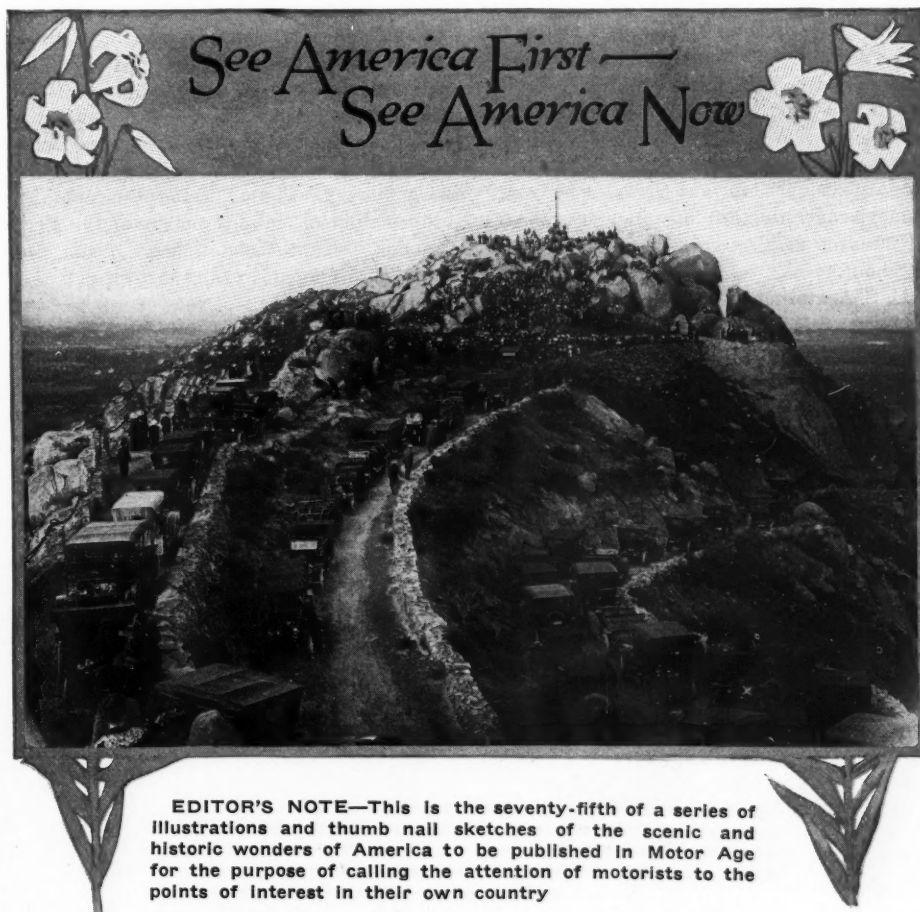
8 months of 1916 there were 16 cars, valued at \$17,364, exported to that country. Italy is purchasing few American cars, only 23, valued at \$18,558 being shipped there in February last, as against 16, valued at \$11,390, in February a year ago, while during the 8 months' period the shipments rose from 42 cars, valued at \$35,112, in 1915, to 207 cars, valued at \$146,144, in 1916. Little Denmark, which is just beginning to figure in the export tables, took 27 cars, valued at \$18,468, in February, while during the 8 months' period of this year the number was 469 and the value \$314,905. Other European countries imported 281 cars from this country in February last, the value being \$301,082, as against 131 cars, valued at \$406,368, in February a year ago, while during the 8 months' period the exports amounted to 832 cars, valued at \$2,300,646, in 1915, and 940 cars, valued at \$975,010, in 1916.

A big increase is noted in the shipments to Canada, 947 cars, valued at \$593,492 being shipped there in February last, as

against 349 cars, valued at \$345,733, exported during the same month of last year. The figures for the 8 months' period are even more impressive, no less than 4,287 cars, valued at \$3,033,808 being shipped across the northern border during the 8 months of this year, as against 1,727 cars, valued at \$2,236,426, exported during the corresponding period of last year. This represents a gain of nearly 50 per cent over the preceding period.

Indies Good Customers

The West Indies and Bermuda are becoming good customers for American cars and this is a market apparently worth cultivating. Five hundred and thirty-eight cars, valued at \$366,188 were exported there in February last, this being a considerable gain over the figures for the same month of last year, which were 183 cars, valued at \$98,630. The gain during the 8 months' period was much greater, the exports increasing from 651 cars, valued at \$439,642, in 1915, to 2,708 cars, valued at \$1,712,084, in 1916.



EDITOR'S NOTE—This is the seventy-fifth of a series of illustrations and thumb nail sketches of the scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the points of interest in their own country

NO. 75—EASTER SERVICES ON MT. RUBIDOUX, RIVERSIDE, CAL.

MOTOR cars from all over southern California, including those owned by many visitors from other States, attend Easter Services on Mt. Rubidoux, Riverside, Cal., at sunrise, Easter Sunday. This is how it will appear next Sunday morning at the beginning of the Easter services.



The lineup of the cars at Corona waiting for the starting signal

O'Donnell Wins Second Race in Week on Coast

Takes 150-Mile Ascot Dash in Battle Between Duesenberg and Pullen's Mercer—Hughes Is Third

LOS ANGELES, Cal., April 16—Special telegram—Driving with the same sure speed which won him the Corona grand prize a week ago, Eddie O'Donnell in a Duesenberg finished his western racing engagement today by winning the 150-mile Ascot motor derby. O'Donnell's time for the event was 2 hours 17 minutes 9 seconds. Speed, 67.4 miles per hour.

Eddie Pullen in a Mercer finished second, his time being 2 hours 17 minutes 27.8 seconds, and speed, 67 miles per hour. Hughie Hughes in an Omar, won third money, covering the 150 miles in 2 hours 18 minutes 24.2 seconds; speed, 66.9 miles per hour.

E. S. Waterman in a Gandy Special, was in fourth place when Hughes finished but was flagged down for the safety of the crowd. The Tahais and Grant Special also were flagged off the course for safety reasons when the crowd became restless after the finish of the first three cars and wanted to get across the course to congratulate O'Donnell on his victory.

Joe Thomas in a Mercer, and Lou Gandy in his other Gandy Special, both went out early in the contest. Gandy broke an oil line and Thomas cracked a cylinder when in third place in the fiftieth lap.

Bert Lloyd in an Oakland Special also retired early. He stripped a timing gear at the start.

R. C. Durant, who was to have driven the Cyclone, and Teddy Tetzlaff, who

was to pilot Durant's entry, the Durant Special, were not present. Durant had signed an entry blank before the A. A. A. sanction number had been placed on the official blanks and as these entry blanks were not official, refused to start or allow Tetzlaff to start when he became offended at the action of one of the officials at the drivers' meeting.

Durant wanted to have No. 7 left out of the drawing and have the pit at Ascot formerly used by Bob Burman decorated with flowers. The officials called upon another driver to make the move at the meeting and Durant took offense. Young Durant had announced that the Ascot race today was his last speed event and he claimed that as he had not signed an entry blank with the sanction number on it, he could retire before the race as well as later. The matter has been reported to the contest board and the case will be thoroughly gone into at the next meeting of the board.

The feature of the race was the fight

between Pullen and O'Donnell; several times Pullen went out in the lead and lost when he had to stop to change tires. In the one hundred and third lap, O'Donnell stopped and changed three tires in 1 minute, 14 seconds. This gave Pullen the lead by more than half a lap. O'Donnell then went out and drove Pullen off his shoes for twenty laps and after passing him and establishing a good lead, Pullen again stopped for a change and from then on O'Donnell took it easy and carried away some more western prize money.

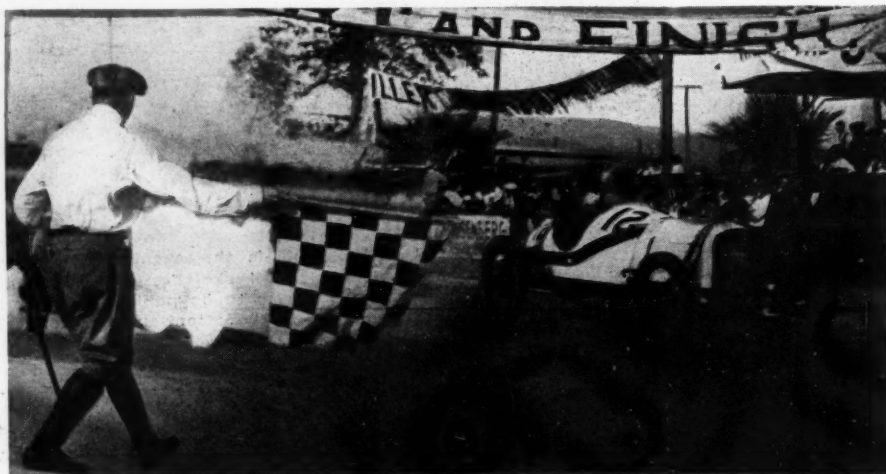
Those who started:

Car and driver	Finish
Duesenberg, O'Donnell.....	First
Mercer, Pullen.....	Second
Omar, Hughes.....	Third
Mercer, Thomas.....	Cracked cylinder
Tahais, Teel.....	Flagged
Grant, Stutzman.....	Flagged
Gandy Special, Gandy.....	Broke oil line
Gandy Special, Waterman.....	Flagged
Oakland, Lloyd.....	Broke timing gears start

WHEELER LEAVES SPEEDWAY

Minneapolis, Minn., April 17—Frank H. Wheeler, president, Wheeler and Schebler, carburetor manufacturers of Indianapolis,

and who was responsible for the construction of the 2-mile cement motor speedway built in this city last year has resigned as president of the speedway organization known as the Twin City Motor Speedway Association, apparently because of the vast amount of legal difficulties that have been connected with the association since its opening last fall. Mr. Wheeler is one of the four owners



O'Donnell receives finish flag, winning the last Corona road race

of the Indianapolis motor speedway and it was entirely due to his influence and money that the Minneapolis speedway was built. H. E. L. Habighorst, St. Paul, vice-president, will be temporary head. Meyers & Gates, attorneys, Indianapolis, have begun civil action against Mr. Wheeler, in the Ramsey county district court for \$24,344.50 attorneys' fees in connection with settlement of the speedway's financial troubles last year.

GALESBURG RACE JUNE 20

Galesburg, Ill., April 17—The Galesburg District Fair Association has received the sanction for 100-mile motor race to be conducted June 20. An effort is being made to induce a number of the drivers at the Chicago speedway races of June 10 to stop at Galesburg en route to the races at Des Moines on June 26. Work will be started at once to place the track in condition.

CHRISTIAENS TO RACE AT CHICAGO

Chicago, April 18—In confirmation of the announcement published in Motor Age April 6 that Joseph Christiaens, the Belgian race driver, will come to America with a Sunbeam to compete in the Indianapolis 300-mile speedway race, word is now received that a team of Sunbeams are being forwarded to this city and will be entered in the derby at the Chicago speedway June 10. Louis Coatalen, managing director of the Sunbeam Motor Car Co., Ltd., who has arranged for the appearance of the team, in a letter to President Reid, of the Chicago track, states that Christiaens will manage the Sunbeam racers and drive one of the cars himself. From Coatalen's letter, it is believed permanent headquarters will be established in this city.

NINE ENTRIES FOR INDIANAPOLIS

Indianapolis, Ind., April 15—A Sunbeam, two Maxwells and three Frontenacs have been entered in the 300-mile race at the local speedway on May 30. The Maxwells are entered under the name of the Prest-O-Lite racing team, and the Frontenacs by the Frontenac Racing Car Co., formed last

winter for the exclusive building of racing cars. Josef Christiaens is bringing the Sunbeam from England.

Eddie Rickenbacher and Peter Henderson will drive the Maxwell mounts, which have been reconstructed during the winter months at the Prest-O-Lite plant.

The three Chevrolet brothers, Louis, Arthur and Gaston, will drive the Frontenacs. The cars are being constructed in the plant of the Frontenac company. Louis Chevrolet, who heads the company, states that he has abandoned his plans of entering the New York race on May 13, and would devote all his time to getting the cars ready for the local race.

The entry of these six cars brings the total up to nine, three Duesenbergs having been entered during the early part of March.

OFFERS TROPHY FOR BEST TIME

San Francisco, Cal., April 14—David A. Curry is offering a silver cup for the motor car making the fastest time from San Francisco to the first checking-in station at the entrance to the Yosemite valley. Elapsed time is to count and the rules of the run are to be formulated by a committee of San Francisco motor car men.

FREIGHT CAR SITUATION

Detroit, Mich., April 17—It may be there is a slightly easier feeling at present, but even if a greater number of freight cars are available due to the lifting of embargoes by some of the eastern roads, the steadily increasing output of the factories quickly absorbs the greater supply of cars so that there is practically as great a shortage as ever, when the number of cars

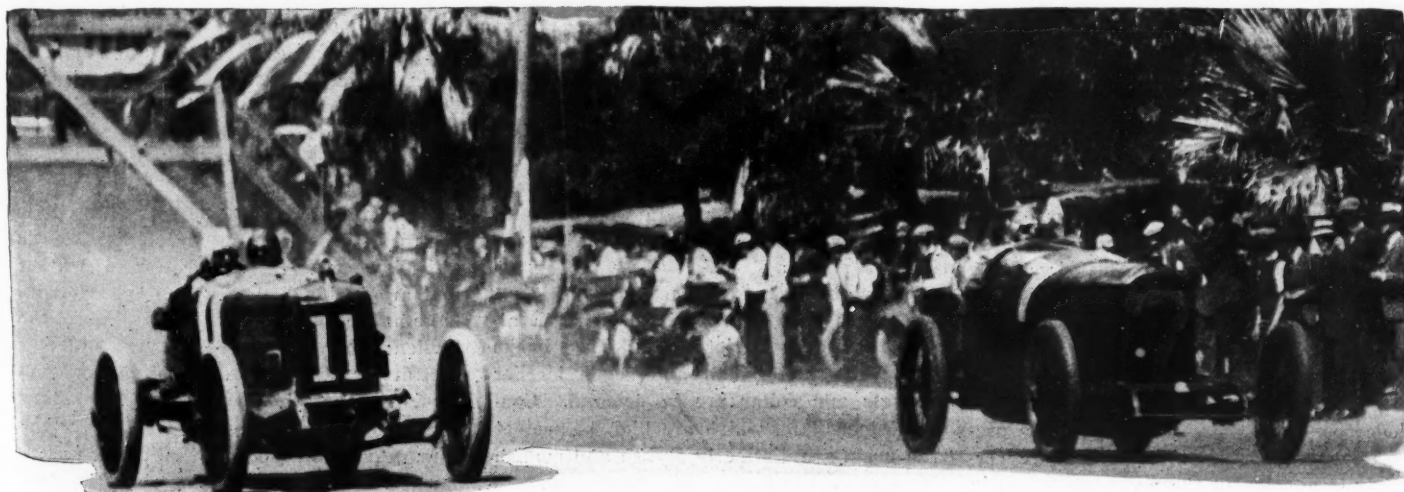
needed is considered. Makers are still shipping large numbers of machines on flats and gondolas with tarpaulins and board superstructures over them. One factor which works against an adequate supply of the right kind of cars is the misuse of the motor car equipment by southern rail lines and shippers who are in the habit of appropriating these cars.

SAFER COLORADO GRADE CROSSINGS

Denver, Colo., April 14—The 3,676 grade crossings over railroads in Colorado will be made safe for motoring and other highway travel, an order to that effect having been issued by the State Public Utilities Commission. The order requires that all such crossings shall be at least 24 feet wide, with approaches straight and at least 20 feet in width, and the grade of the approach must not exceed 6 per cent. The approach must be smooth to guard against danger of stalling vehicles, and the crossing must be planked between the rails the full width of the



The wreck of Burman's Peugeot at Corona



Last race between Bob Burman and Barney Oldfield. This was taken during the Corona race, just before Burman's fatal spill

crossing and 1 foot beyond on each side. The railroads will be given an opportunity to present protests if they desire.

TAR RULING IN NEW ENGLAND

Boston, Mass., April 15—New England motorists this year will not find it necessary to drive through tar on newly constructed roads. Since, a law has been passed requiring contractors to spread oil or tar on only one side of the street or road at a time. Sand must be placed upon oil parts and in a reasonable time after the highway has been so treated and when that side is dry, work on the other side may be started.

NEW PLANT FOR PULLMAN

York, Pa., April 13—The Pullman Motor Car Co. is contemplating building a new plant on a 40-acre tract at Grantley Station in the city. Present quarters are inadequate. The company is very busy at the present time. The last month's output was 900 cars. If it is decided to build a new plant, it will be started at once. The old plant will be gradually transferred to the new one, and in about a year, it is believed, the entire Pullman establishment will be located at Grantley.

N. G. E. A. OPENS CLEARING HOUSE

New York, April 15—The National Gas Engine Co. has opened a clearing house for its members. This is the result of the present difficulty of obtaining material used in the construction of internal combustion engines and means that one member having a quantity of stock which is not being used, may exchange with some other member for something the latter has

that is not being made use of at that time. The head office receives a list of dead stock from each member and also a list of requirements from each member, thus keeping all members closely in touch with the others to their mutual benefit.

WATER PLUS POWDER EQUALS FUEL?

Farmingdale, N. Y., April 17—Most recent of the proposed substitutes for gasoline as fuel is a powdered chemical which Louis Enricht claims to have invented, and which when added to water will produce a fuel which is as good or better than gasoline according to the claims of the inventor. Enricht says that 4 ounces of his chemical will make fuel of 5 gallons of water at a cost of 1½ cents per gallon. As in all of the cheap fuel inventions which have appeared, the chemicals are secret. Nothing official on the fuel has been given out, and no official tests have been made.

ZENITH NOT ENJOINED

Chicago, April 15—On page 39 of the April 6 issue of Motor Age was published a news item covering a new suit brought by the Stromberg Motor Devices Co., Chicago, against the Zenith Carburetor Co., Detroit, in which it was stated that a temporary restraining order was sought and obtained by Stromberg. Our attention has been called to the fact that while it is true that Stromberg has entered a new suit against Zenith, nevertheless Zenith never has been under any injunction or restraining order, our statement to this effect being untrue. In order to prevent an erroneous impression of the present status of the earlier litigation in this carburetor patent suit, it is well to explain that Zenith filed a bond

to avoid such an injunction being issued against it, but, after full hearing, this bond was ordered dissolved by the court. It was after this final hearing that the Stromberg company carried the case from the district court to the circuit court of appeals. Zenith at the same time filed a counter appeal from a minor part of the decision. These appeals were joined and argued before the court of appeals in this city, and a decision is expected now at any time.

SEATTLE MOTOR CAR SHOW

Seattle, Wash., April 15—Fifty cars formed a display at Seattle's third annual motor car show held in the arena. Many Canadian cities were represented among the visitors.

SOCIABILITY RUN IN JULY

St. Paul, Minn., April 20—President H. H. Orme of the Minnesota State Automobile Association has called a meeting of the board of directors, April 22, at which plans for a sociability motor tour to Yellowstone national park were completed. This run, which is scheduled to leave the Twin Cities July 20, will eclipse all previous events of a similar nature.

Dates have been arranged so that the tourists will reach Medora, N. D., July 24, in time to participate in the ceremonies incident to opening a new \$18,000 bridge across the Little Missouri river. Medora, as Colonel Roosevelt's old home, is already making preparations for the occasion and Mr. Roosevelt has indicated that he will attend. The tour will be over the National Parks Transcontinental highway which practically follows the Northern Pacific right-of-way to the Pacific coast.

Timely Wearing Apparel for Motorists

What Should Be Worn During Next Two Months Offers Some Novelties

EVEN before Winter has retreated with his snowy legions the call of the out-of-doors has been heard by the fashionable woman. Spring weather is near and the mind of the enthusiastic motorist is dwelling longingly on the delights of touring and the open road. The time is opportune to cast an eye over the motoring wardrobe and note what deficiencies can be filled.

The general trend this year has been to produce garments that, while supplying the peculiar needs of the motorist, do so without making the wearer conspicuous should he or she take the sidewalk for a few blocks. Many of this year's overcoats, indeed, are hardly distinguishable from the ordinary overcoat.

This year there is a demand for fuller and snappier overcoats, with more style to them than last year. Novelty is the prerogative of sport clothes—and there certainly is novelty in the materials found in this year's motoring coats. Tweeds, gabar-

dines, velours, serges, mohair, Palm Beaches and Tusser silks are being made up in the latest styles. Motoring apparel for women has followed the dictates in styles originated in the first-class shops on Fifth avenue, New York. From these shops originate the ideas for the latest styles in motoring apparel and after their appearance on the streets, it usually takes about 5 months before the department stores take them on. The accompanying illustrations embody the latest ideas in women's patterns as well as some of the season's showing for men.

Variety of Motor Coats

Motoring coats are being shown in almost confusing variety. Full flare backs with draw string belt and suede leather pockets and collar are in demand. Convertible collars, which are high to protect the neck, are distinctly stylish and modish in this year's motor coats. Sport coats are striped in bright colors and are made mostly

in plaid wool velours. A majority of these coats are cut with full drop shoulder sleeves and flaring skirt.

There is little change in hat styles. They are small, narrow-brimmed, and made in stripes, checks, Palm Beach linen, and in plain and combination colors. There is a tendency towards lightness in weight, being made up in straws, bankoks and panamas. The trimmings are of fancy colored leather and ribbons with silk linings.

Women's gloves this year are little changed. The gauntlet type with elastic wrist is very popular. These are of leather and are in black, tan and grey. Goggles have undergone few changes in design, the tendency being towards comfort and perfect fitting. One type that is proving popular is an enameled white rubber sanitary goggle with smoke lens, and hooks for the ears. Another type is the plain unobscured goggle without a rim, the lens lying close to the eyes with full protection.

Early Spring Fashions for Men and Women Motorists

Chauffeur's outfit of white rubber. Coat has black velvet collar. The cap cover and cape and the leggings match. Marshall Field & Co., Chicago



All clothing not otherwise credited is by the Auto Supply Co., New York



Left—Ladies' knit sport coat, sash belt in purple, green and old rose. Price, \$16.50

Above—Black and white check sport hat with blue or black and rose borders. Price, \$4.50

Right—Hat of Angora and sport suit of Jersey cloth. Bonwit, Teller & Co., New York





Gauntlet gloves, shirred wrists, in black, tan and gray. Price, \$4.50



Convertible collar, double belt in back only. Patch pockets in black and white; English tweed. Price, \$22.50

Black and white checked dust coat. Full belt, large patch pockets. Price, \$22.50



Left—A most attractive new sport coat, showing new plaited cape effect. Made of wool velour and in combinations. Garment Specialty Co., New York

Right—Day coat of gabardine, made with 7-yard sweep around bottom and trimmed with Scotch plaid collar and cuffs. Garment Specialty Co., New York



Clever sport model made of wool velour. Can be worn open or closed high at neck





Above—In the rear seat is shown a green suede, French calfskin, short motoring coat, with full belt and expanding plait in back. The man at the wheel is wearing an English-made Persian lamb motoring vest with silk sleeves. Collar can be buttoned up close to neck or turned under. Lady is wearing storm coat that buttons high at neck. Marshall Field & Co., Chicago

Left—Palm Beach sport hat trimmed in fancy combinations. Price, \$3.50

Right—Top coat of brown tweed with cape effect. Garment Specialty Co., New York



Sport coat made of wool velour check with full back. Garment Specialty Co., New York



Green and blue velour sport coat. Back belted; novelty pocket. Price, \$25



Girl's hand-finished lamb's wool sweater, full belted with shawl collar. Price, \$5.50 to \$7.85



Tussar silk, set-in sleeve with green leather collar and cuffs and full belt. This is a popular model

More Miles Per Gallon

Studebaker Corp. Conducting Series of Tests for Car Owners

Service Men Show How to Get Most Efficiency from Fuel

DETROIT, Mich., April 17—In order to convince owners that they could operate their cars with greater gasoline economy if they would but handle them more intelligently, the Studebaker Corp. has recently carried on a number of tests in all sections of the country among owners of Studebaker cars. The idea has been worked out not with the thought of making tests primarily, but mainly to show owners how to get the greatest possible mileage per gallon.

In actual operation, the Studebaker plan has been carried out in somewhat the following manner: An expert calling upon an owner who is not getting maximum mileage, first disconnects the regular gasoline supply and attaches an auxiliary tank containing 1 gallon. The owner then takes the wheel and drives a few miles, the expert at his side making mental notes the while. At the end of this run, the amount of gasoline used is measured.

The expert from the factory then relieves the owner at the wheel. Before starting out he adjusts the carbureter, and any other things that may need adjusting, in order to obtain greatest economy in operation. The expert then drives the car and drives it properly, explaining the owner's faults to him as they go along.

Reports indicate that in most instances the owner did not have the carbureter adjusted to best advantage. In other cases he might have had a tendency to leave the motor running while away from the car for a considerable length of time. In still other instances his fault might be in speeding up the motor and slipping the clutch when a shift of gears would have been the logical thing to do. Possibly spark plugs might have influenced the economy. At any rate, the factory expert is doing some great missionary work, and the Studebaker Corporation likes the idea immensely.

RIITMAN STILLS IN MEXICO

Tampico, Mex., April 14—Fifty Rittman stills will be used by the Pierce Oil Corp., at Tampico, and twenty-five by the Eagle Petroleum Co. in their Mexico refineries.

PARADE PROTESTS GAS PRICE

Pittsburgh, Pa., April 17—"Bust the Gasoline Trust," printed on a placard, was the label seen on nearly 300 motor cars which took part in a parade in Pittsburgh, April 17. The parade was held under the auspices of the Automobile Dealers' Association of Pittsburgh. It had been widely advertised and Fifth avenue was a solid mass of spectators waiting to see the unique procession. Among the placards which were displayed prominently was one, "Remember the Boston Tea Party," which appeared on the car of President Frank Saupp, of the Automobile Dealers' Association. This organization lately declared war on the Standard Oil Co. Resolutions asking motor car owners to refrain from the use of gasoline at present high prices and to assist dealers in finding a substitute, were passed also by the same organization.

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SENATE ADOPTS MARTINE BILL

Washington, D. C., April 17—Another step in the government's gasoline probe was the adoption today by the senate of the preamble to the resolution by Senator Martine, of New Jersey, directing the attorney general to investigate and report whether any law is being violated which would account for the present situation in the oil and gasoline industry. The adoption of the preamble completes action on the resolution. The preamble attacks the Standard Oil Co. This action was taken after a brief debate in which Senator Martine described the aggravated conditions in the gasoline market and pointed out that the attorney general has refused to submit reports on the situation as requested in the Kenyon resolution, alleging that such a move would be incompatible with the public interests. Senator Kenyon said that if there was no information in the department to show that discrimination or violation of the law has occurred, there would be no reason for declining to send in the reports for which the senator asked.

Making Aero Engines

J. G. Vincent Tells of Problems That Confront Present-Day Designers

Detroit Section of S. A. E. Hears Valuable Discussion

DETROIT, Mich., April 18—Special telegram—J. G. Vincent, Packard chief engineer, in telling of the problems which confront the designer of aeronautic engines and reviewing the conditions that have brought about the keen interest now felt in engineering circles regarding the aeroplane, says that before the war no one had a definite idea as to what type of engine was best, there being great variety of cylinder arrangements, etc. The Germans put the problem up to motor car engineers and the Mercedes engine built along motor car lines was the result. In France the aircraft engineers attacked the problem, therefore their leaning was toward the air-cooled rotary type due to the fact that for long flights the rotary type requires carrying such large tanks of oil and gasoline. The rotary became heavier than the light design of motor car engines, therefore, the conclusion is drawn that for light scout work the rotary air-cooled has a place, but for long flights, heavier loads and reliability, the fixed cylinder type is best.

Some of the points favored in aircraft by Mr. Vincent are geared down propeller, overhead valves, overhead camshafts, lighting and starting equipment so as to start again if motor stalls in the air.

This was brought out at the annual meeting of the Detroit section, S. A. E., which was attended by about 400 members.

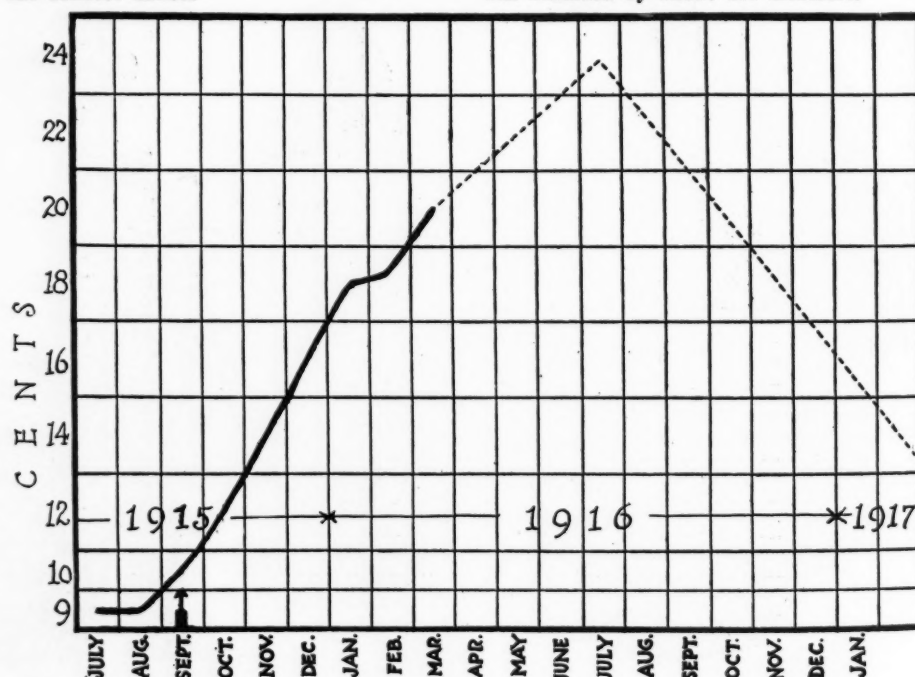


Diagram showing curves of gasoline prices per gallon to March 1, 1916, and probable curve of final lowered prices, as predicted by Dr. Rittman. Arrow indicates date of discovery of new process. Some time must necessarily elapse before its effects will be felt. Note prices vary according to locality

Paul Smith, sales manager for the Chalmers company, appealed to the engineers to get closer in touch with the public for which they are building and to give the public what it wants. He favored industriously refining and improving cars as they now are, without constantly changing the essentials. More conveniences, better looks and more accessories are the important things to strive for, he said. He laid special emphasis on the need of reliability, saying that no matter what the price class, the buyer has that uppermost in mind. The other four factors of appearance, performance, economy and price change places with one another in relative importance in accordance with cost of car. He attacked some of the present deficiencies of nearly all cars, such as squeaking brakes, poor gasoline vaporization and fuel economy. Price alone does not sell anything, he said; it is price plus reliability.

Officers elected for the coming year are D. McCall White, Cadillac, chairman; O. E. Hunt, Packard, vice-chairman; W. C. Rands, Rands Mfg. Co., treasurer; B. G. Koether, Hyatt Roller Bearing Co., secretary, and K. W. Zimmerschied, General Motors, member national nominating committee. The section has a membership now of over 500, and is in a healthy condition financially.

WILLYS-KNIGHT ADOPTS ADCO

Toledo, O., April 18—Willys-Knight cars will carry Adco shock absorbers as standard equipment on the 1916 new series. This is the first coil-spring shock absorber ever adopted as standard equipment on any motor car, it is said.

NEW DES MOINES BRANCH

Des Moines, Ia., April 15—A new branch of the Studebaker Corp. is to be established immediately in Des Moines. It will supply parts to Studebaker owners and dealers in Iowa and adjacent territory in other states. The local branch will be in charge of J. A. Haskell, formerly assistant manager of the Studebaker branch at Cleveland, O. A \$100,000-stock will be handled here, a force of fifteen men employed, and 5,000 cars handled annually through this branch. A new building is to be erected to house the new branch.

MOTOR AGE MAN FIRED UPON

El Paso, Tex., April 14—Hiram Sibley, special correspondent for Motor Age on the Mexican border, and William R. McCulla, Packard aircraft motor engineer, who holds the motor car record between Chicago and Detroit of 7 hours 9 minutes, were fired upon early yesterday near Aden, N. M., while making a trip by motor from Columbus, N. M., to El Paso. Two shots were fired at close range, neither of which took effect. Aden is several miles from the border and it is thought the shots were fired by a Mexican section hand of the Southern Pacific tracks which bordered the wagon road.

Roads Campaign Begun Nebraska Boosters for Better Highways Call on Farmers to Aid Movement

Omaha Motorists' Organization in Appeal for Greater Civic Pride

OMAHA, Neb., April 15—Civic pride is being appealed to in the state of Nebraska, in order that country roads may be kept in fit condition. And thus far, appealing to civic pride is about all that it appears there is to do, for Nebraska has no law which compels the property owner to keep the roads along his premises in proper shape. It is frankly, though pessimistically, conceded that comparatively little is expected from civic pride.

In Douglas county, for instance, there is available at present a fund of \$20,000 for road dragging, this amount being the county's share of the motor car registration fees, which averages about five-sixths of the total revenue from this source. But the great difficulty in getting the work done is the apparent indifference of the farmers to do the work for the cash return involved. And it is upon the farmers that the bulk of the work is naturally expected to devolve.

SPAIN BUYS AMERICAN CARS

New York, April 14—A shipment of motor cars for the Spanish government has left this city on the Spanish transport *Almirante Lobo*. The cars and other goods were purchased under the immediate supervision of the official Spanish commission, composed of army and navy officers, and will be installed in the Spanish government's military plants. The commission will remain here probably until the end of the war.

BIGGER TYPE FOR MORTGAGES

Louisville, Ky., April 15—Motor car dealers who economize on paper by using fine print in mortgage blanks have met with the disapproval of a county clerk and his deputies and it is likely the matter will be taken into court to ascertain if the law will require the dealers to have their mortgage forms printed in large type.

CHALMERS REACHES HIGH MARK

Detroit, Mich., April 17—The Chalmers Motor Co. reports that during the 27 working days of March the value of cars shipped was \$3,865,000, indicating the greatest year's business in the history of the concern. On March 31, there were \$300,000 worth of Chalmers machines shipped, the record day since the formation of the company. Although new sales and production records have been established in the last 3 months, Sales Manager Paul Smith says that Chalmers entered the month of April with

\$8,400,000 worth of orders on its books. Chalmers dealer representation also has rapidly increased, more than 1,000 cities and towns in the United States now claiming a dealer for this make of car.

USED CAR SHOW POSTPONED

Chicago, April 15—The used car show, which was planned for this spring by the Chicago Automobile Trade Association, has been postponed for probably 1 year. On account of the shortness of time after approval was given by the National Automobile Chamber of Commerce it was thought that it would be unwise to attempt to stage the show in May of this year.

K. C. DEALERS FOR SAFETY

Kansas City, Mo., April 17—The Kansas City Motor Car Dealers' Association has appointed a special committee to co-operate in the work of greater street safety and is one of the first associations in Kansas City actively to take up this work. It will work for better observance of traffic rules, the training of boys and girls to greater care in crossing streets and greater safety in connection with garages and sales rooms.

TRACTOR DEMONSTRATION DATE SET

Chicago, April 15—Dates for the 1916 tractor demonstrations have been set as follows:

July 17-21—Dallas, Tex.
July 24-28—Hutchinson, Kan.
July 31-Aug. 4—St. Louis, Mo.
Aug. 7-11—Fremont, Neb.
Aug. 14-18—Cedar Rapids, Ia.
Aug. 21-25—Bloomington, Ill.
Aug. 28-Sept. 1—Indianapolis, Ind.
Sept. 4-8—Madison, Wis.

The first of the tractor demonstrations was held at Winnipeg, Canada, and was an annual event for a number of years in the dominion prior to holding any in United States.

SAXON AFTER 3,000 MARK

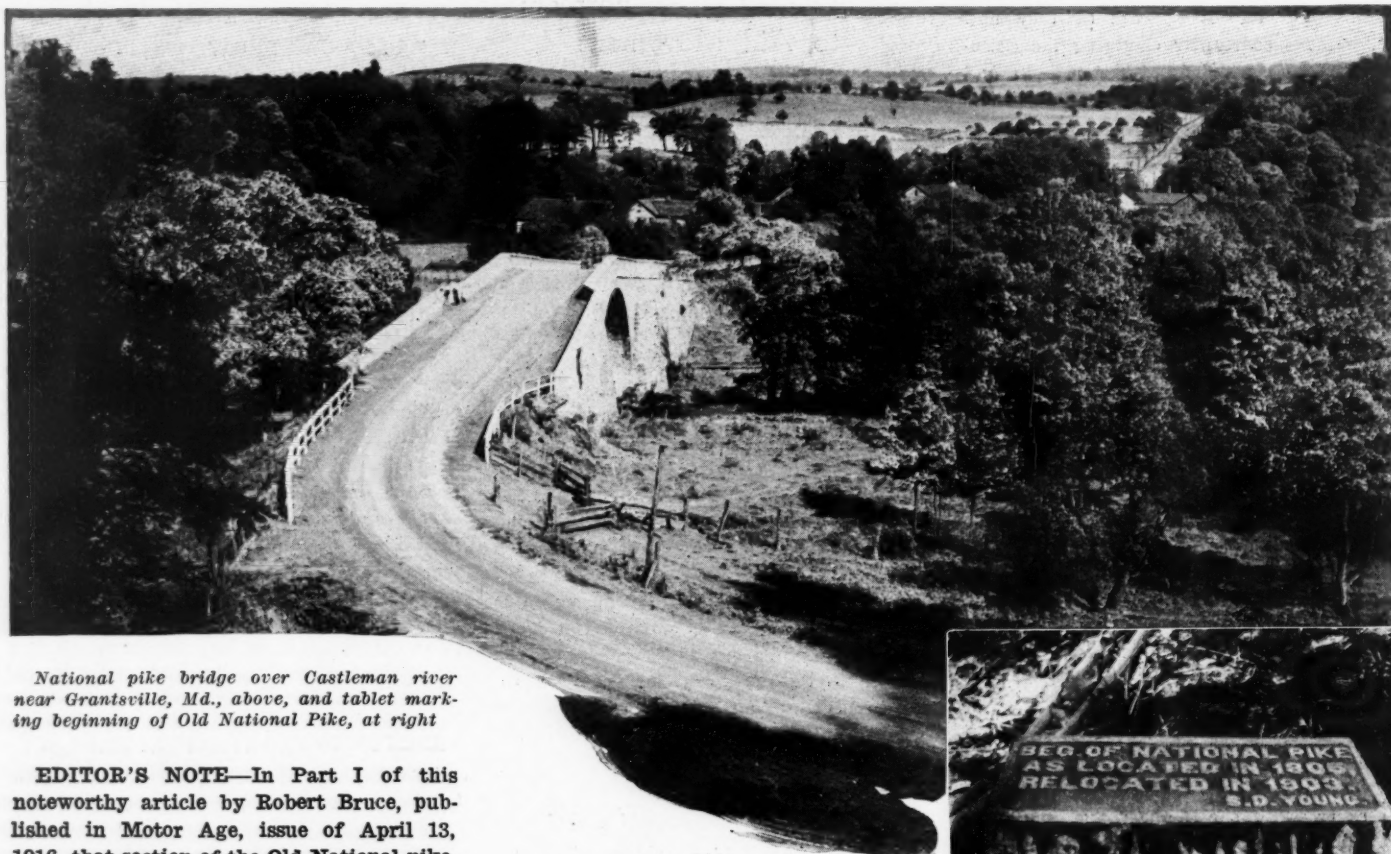
Detroit, Mich., April 17—For the first 9 working days of April, the Saxon Motor Corp. shipped 1,086 motor cars, making an average of 120 per day. As the record month so far was March, with 2,604 shipped, it seems more than likely that this record will fall before the April total, which would be over 3,000 cars if the present rate continues during the entire month. In January, 1,556 Saxons were shipped, and 2,231 in February.

BOY THIEVES PRESENT PROBLEM

Spokane, Wash., April 14—Owing to the number of car thefts most of which are traceable to boys who in the majority of cases are given their liberty because of their age, 2,000 citizens of this city recently held a mass meeting to protest against the lukewarm way in which prosecutions had been made and to offer suggestions for putting a stop to robberies of this character.

How the Old National Pike Has Been Rejuvenated

In Two Parts—Part II



National pike bridge over Castleman river near Grantsville, Md., above, and tablet marking beginning of Old National Pike, at right

EDITOR'S NOTE—In Part I of this noteworthy article by Robert Bruce, published in Motor Age, issue of April 13, 1916, that section of the Old National pike, known as the Washington-Baltimore-Fredrick triangle, has been described. Part II has to do with the western link of this historical road, between Cumberland, Md., and Wheeling, W. Va.

AT Cumberland, Md., the character of the Old National pike changes. Here the Potomac makes a sharp bend to the south, no more to be seen on this trip, though its wonderfully picturesque tributary, Wills creek, is followed out of the city into and through the Cumberland narrows, one of the most noted Allegheny mountain passes, and perhaps the most interesting topographical feature between Washington, D. C., or Baltimore, Md., and Wheeling, W. Va. Here is found a practically level road along the floor of the gap or gorge, whose average width from the towering heights of the two sections of Wills mountain is about $\frac{1}{2}$ mile at the top, sloping to 125 yards at the bottom, and 900 feet deep.

Geographically, that section of the National pike between the Atlantic and the Ohio river divides naturally

By Robert Bruce
of the Automobile Blue Book

at Cumberland, Md., a historic town of 23,000, at the head of navigation on the Potomac, 125 miles from the White House as the crow flies. Cumberland was originally settled by the Ohio company before the days of Geo. Washington and became an important frontier post, from which westward flowed the tide of settlement. Today, Cumberland's chief claim to fame is as a great railroad and highway center. Here the tourists traveling westward can continue ahead to the Mississippi or can turn north toward Cleveland and all the great lake centers, or south through the Shenandoah valley, connecting with trunk lines threading the southeastern states.

Wills creek, flowing through the center, is crossed at the eastern end of the narrows by a picturesque and historic stone bridge, the building of which provided the National pike with a nearly level entrance into the Alleghanies, and opened the easiest way to and over the main



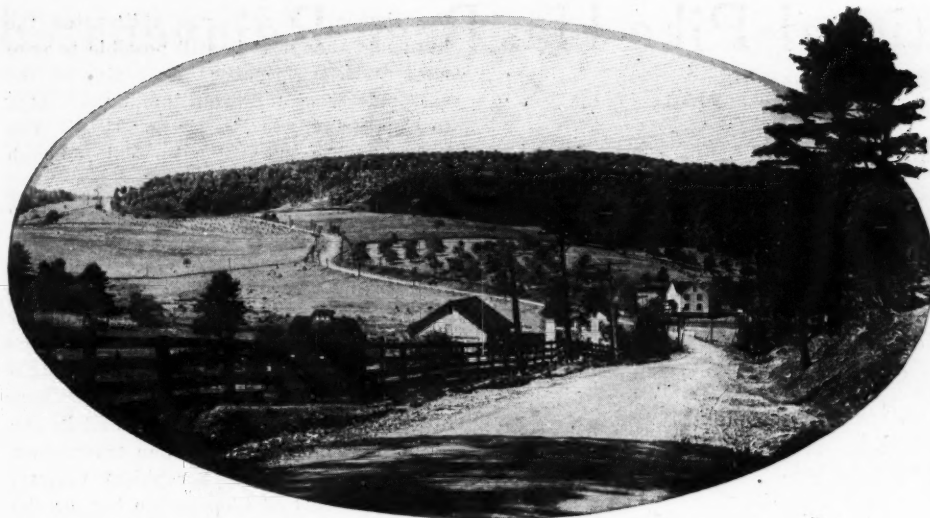
ridges a few miles beyond this point, which makes for easier traveling.

The old pike, which, of course, had the first choice for right of way, is now, as in the days of the stage coach and freight wagon, the principal gateway to the west, with no alternate passage for many miles.

From the western end of the narrows to Frostburg, the next important town, there is now a choice of two excellent motor routes, instead of only one, as in former years. Old-time tourists who recall the rough surface on the direct line of the pike for the next few miles will be pleasantly surprised to run onto fine broad stretches of concrete laid along the comparative levels of Braddock run, a picturesque tributary of Wills creek. This in turn leads onto the macadam, some of it re-surfaced as late as the fall of 1914, which ascends the long steady grade through Clarksville and Eckhart; into



Tablet at Braddock's grave, on the right-hand side of the National Pike, a few miles east of Uniontown, Pa.



Looking west at Frost's farm in Maryland

Frostburg. Motorists traveling this route for the first time will usually follow the pike throughout, because it is everywhere wide and plain, as well as being a vital part of the old historic highway to the West.

But within the last 2 years, an entirely new and even more scenic option has been completed up the left-hand side of Wills creek as far as Corriganville. There it leaves the creek by turning west along the valley of Jennings' run, through Barrelville and Mount Savage, entering Frostburg from the northeast. While the pike follows along the approximate levels immediately west of the narrows, this new scenic route skirts the foothills to the north, affording many exquisite views. Tourists having once made the conventional trip over the pike will find what has now come to be popularly called the Mount Savage route very interesting indeed, only 3 miles longer, and an equally good road, though there are frequent sharp curves and numerous grades, especially in the vicinity of Frostburg. It is the best example on this trip of the results from the fairly recent state aid program in Maryland, and also practically the last option along the National road from Cumberland to Wheeling, though there are many tempting side-trips.

Big Savage Elevation 2,280 Feet

The next few miles along the pike are mostly up grade to and across Big Savage mountain, elevation 2,880 feet, the first of the three principal Alleghany summits on this route in Maryland. A series of most wonderful views are to be had on the way up, especially from the lookout easily reached by a left turn to St. John's rock, just before the crest of the mountain; this road was built by private subscription, and only opened in the summer of 1915. From the rock, and to a large degree also from the pike, one may look back and see Wills mountain, the Cumberland narrows, Sandy gap, through which the route of the older Braddock road passed; Dans mountain, whose huge bulk looms up about half-way between Big Savage and the Potomac;

Frostburg, set in the most charming highland scenery; while, if the day is clear, the view also extends across the Mason and Dixon line a hundred miles or so into Pennsylvania.

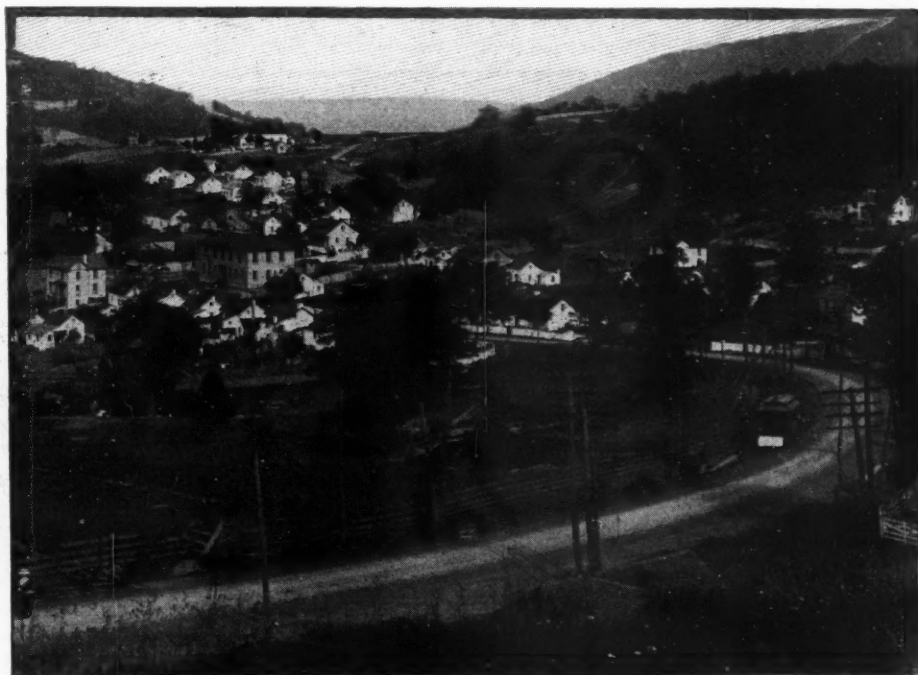
While the grades across some of the ridges between Hancock and Cumberland, especially Sideling hill, are fully as steep as those in this section, the latter, in reality, the backbone of that part of the Appalachian system crossed by this trip, reach considerably greater elevation, and the views naturally extend over a much wider sweep of territory. The road could easily have been built somewhat around rather than straight across some of these ridges, securing at the same time more uniform and lighter grades. But that would not have been in keeping with the letter of the law which created the National pike. So carefully was the route originally laid out that the loss of distance

in the mountains is remarkably small, the highway seeming always to find the shortest and easiest way across from one summit to another—usually by running down along the side of one ridge to the foot; and then perhaps at once, but more often after a restful stretch of level road, making the corresponding ascent on the other side.

Descending of the Western Slops

From the wind-swept top of Big Savage, there is a gradual descent of its western slope followed by a corresponding ascent, this time up Little Savage mountain, which is 120 feet lower than Big Savage. On the right, immediately beyond Little Savage, is the farm of Thomas Johnson, a descendant of the first state governor of Maryland, who nominated George Washington as commander-in-chief of the continental armies; his house is at the fifteenth-mile post west of Cumberland, or the fourth beyond Frostburg. Nearly opposite, but a trifle farther west, are Mr. Johnson's spacious barns, at the beginning of the longest straightaway so far on the pike west of Cumberland. This was known in stage coach days as the Long Stretch, a continual succession of up and down grades, but without any deviation from a direct line for $2\frac{1}{2}$ miles—naturally longer to the freight wagon driver of three-quarters of a century ago than to the motorist of today. A mile beyond the west foot of Little Savage mountain, the route crosses Fishing run, the first northward-flowing stream, the waters of which find their way into the Monongahela, the Ohio, the Mississippi and ultimately into the Gulf of Mexico.

The next few miles are over lesser ranges and across minor streams, gradually nearing the Castleman river, which is a tributary of the Youghiogheny, and often



Characteristic, wide, safe turn on the National pike, looking west into and beyond Eckhart village. It is possible to trace on the picture the course of the old road through the town and over the first hill beyond



Old toll gate on National pike near Addison, Pa.

called the Little Yough, though that term properly belongs to a branch of the main stream near the Maryland-West Virginia boundary. This is crossed by a famous arched stone bridge, well worth a stop to examine with care, especially the fine masonry work underneath. Just beyond begins the long grade up the eastern slope of Negro mountain, which is 2,906 feet at the top, or slightly higher than Big Savage. Descending its western slope, the tourist crosses a stone bridge over Puzzle run and begins to climb Keyser's ridge, 2,880 feet, the same height as Big Savage, and the last of the three principal summits mentioned in a preceding paragraph.

An Appreciation of Maryland's Roads

Keyser's ridge—an exposed and windswept summit, like Big Savage mountain and Negro mountain—is identified only by a small country store, on the right near the thirty-first milestone from Cumberland, or the one-hundredth from Wheeling. But it is important as marking the point where the Accident and Oakland pike branches directly south for as fine a 26-mile stretch of road as can be found in the Appalachian mountain country. This was not completed until the fall of 1915, and will therefore be practically new to the motor tourists of 1916. Its only good connection from the east or west is by the National pike to Keyser's ridge and then south.

No one making a through trip across this section and not really pressed for time can afford to miss that wonderful detour which leads through the Cove, passing the highland villages of Accident and McHenry to Oakland, even if at that point it is necessary to economize time by simply

turning around and retracing the 26 miles at speed to Keyser's ridge.

Most visitors to Oakland also run to nearby Mountain Lake park or Deer park or both, to have the advantage of more ample hotel accommodations than exist at Oakland, through the latter is as far as one needs to go for the scenic detour itself.

Continuing the trip from the junction of the Accident and Oakland pike at Keyser's ridge, the National pike descends the western slope of that range and crosses Winding ridge, a lesser mountain, to the Maryland-Pennsylvania line at the little hamlet of Strawn, Pa.

From now on, all the way to the Ohio river, the country traversed is of lower average elevations, though Chestnut ridge or Laurel hill, a few miles east of Uniontown, Pa., is nearly as long and steep as those in Maryland. On the right at the state line is one of the most interesting mile-posts along the entire route; time and

the elements have partly obliterated the lettering, though it is still possible to read most of it. Originally the wording on the east side was: "State Line, Penn.; $34\frac{1}{4}$ to Cumberland, to Frostburg $23\frac{1}{4}$." The larger figures are still quite plain, though the fractions have become dim.

It is quite likely that the tourist who has made this trip from Baltimore or Washington through Frederick, Hagerstown, Cumberland and Frostburg, across the full length of the Old Line State, will leave it with some regret. With a very few exceptions of short pieces of road, this highway is nearly perfect throughout. It is literally a highway of history, and in the course of about 175 miles one traverses a section of unusual topographical variety, from the levels of Chesapeake bay or the Potomac river to the three highest elevations on the Alleghany mountains on this route. There is not an uninteresting mile on the whole trip, but a constant succession of cultivated fields, fine meadows, woods and mountains; and the interest is much increased by the scenic possibilities of the Keyser's ridge, or Oakland side-trip.

The student of road building will notice a large amount of limestone in central and especially western Maryland. Engineers and contractors there say that limestone macadam stands the heavy traffic over the National pike better than any other material, not excepting concrete, of which several miles were laid near Cumberland in 1913 and 1914. When warm days follow extremely cold weather, melting the snow and ice, the water runs under the concrete; then, very likely it freezes and cracks the concrete so that the road crumbles in the spring. But a well-built limestone road will not freeze to a depth of more than 2 or 3 inches, which is not enough to bulge up and crack the surface.

The interstate boundary crossed at

Strawn was long the subject of dispute between Pennsylvania and Maryland, the claims of the latter being conspicuously advocated by Colonel Thomas Cresap, the pioneer western Maryland settler, revolutionary officer and Indian fighter. The controversy was finally settled in 1762 by a decree of Lord Chancellor Hardwicke, under which the present boundary between the two states was laid out. On the right, three-tenths of a mile beyond, the tourist passes a large boulder with tablet placed by a nearby Pennsylvania chapter, Daughters of the American Revolution, to mark the intersection of the present National pike with the older road followed by Washington in 1753 and '54, and



Site of Fort Necessity, within view of the National pike just west of Farmington, Pa. Here, on July 4, 1753, George Washington made his first and only surrender to a superior force of French and Indians who had come from Fort Duquesne to surprise his small company of Virginia militia. The man in the picture is Archer Butler Hulbert, professor of American history in Marietta college, Marietta, O., who has placed some stones to represent his idea of one side of the now extinct stockade fort

also by Braddock's unfortunate army in 1755. It is well worth while to stop and read the wording on the tablet, in raised, metal letters, as follows:

WASHINGTON-BRADDOCK ROAD

THIS ROAD WAS ORIGINALLY THE INDIAN PATH KNOWN AS NEMACOLIN'S TRAIL

FROM THE NAME OF THE DELAWARE INDIAN GUIDE FOR THE OHIO COMPANY.

THIS WAS THE ROUTE FOLLOWED BY WASHINGTON ON HIS MISSION OF 1753 AND ON HIS MILITARY EXPEDITION OF 1754.

GENERAL BRADDOCK FOLLOWED THIS ROUTE IN HIS CAMPAIGN AGAINST FORT DUQUESNE IN 1755. ABOUT ONE HUNDRED YARDS SOUTH OF THIS POINT BRADDOCK'S ROAD PASSES FROM MARYLAND INTO PENNSYLVANIA, CROSSING THE MASON AND DIXON LINE, AND HERE IT IS CROSSED BY THE CUMBERLAND OR NATIONAL ROAD.

THIS TABLET IS PLACED BY THE GREAT CROSSINGS CHAPTER, DAUGHTERS OF THE AMERICAN REVOLUTION, SEPT., 1913.

One is not long in Pennsylvania without noticing that the old pike in the Keystone state is not crowned so high as in Maryland; or, in the opinion of the most travelers, are even the newer stretches kept in quite as good condition. At least three of the old toll-houses, the property of the state, still remain, though the gates have long since disappeared, so that the traveler over the direct line from Baltimore to Wheeling finds it unnecessary to pay a cent for toll on highway or bridge.

In midsummer, 1915, there were only three gaps remaining unfinished on that part of the National pike in Pennsylvania: 1—A stretch of 6 miles east of Uniontown. 2—A 4-mile gap between Centerville and Beallsville. 3—About 6 miles between



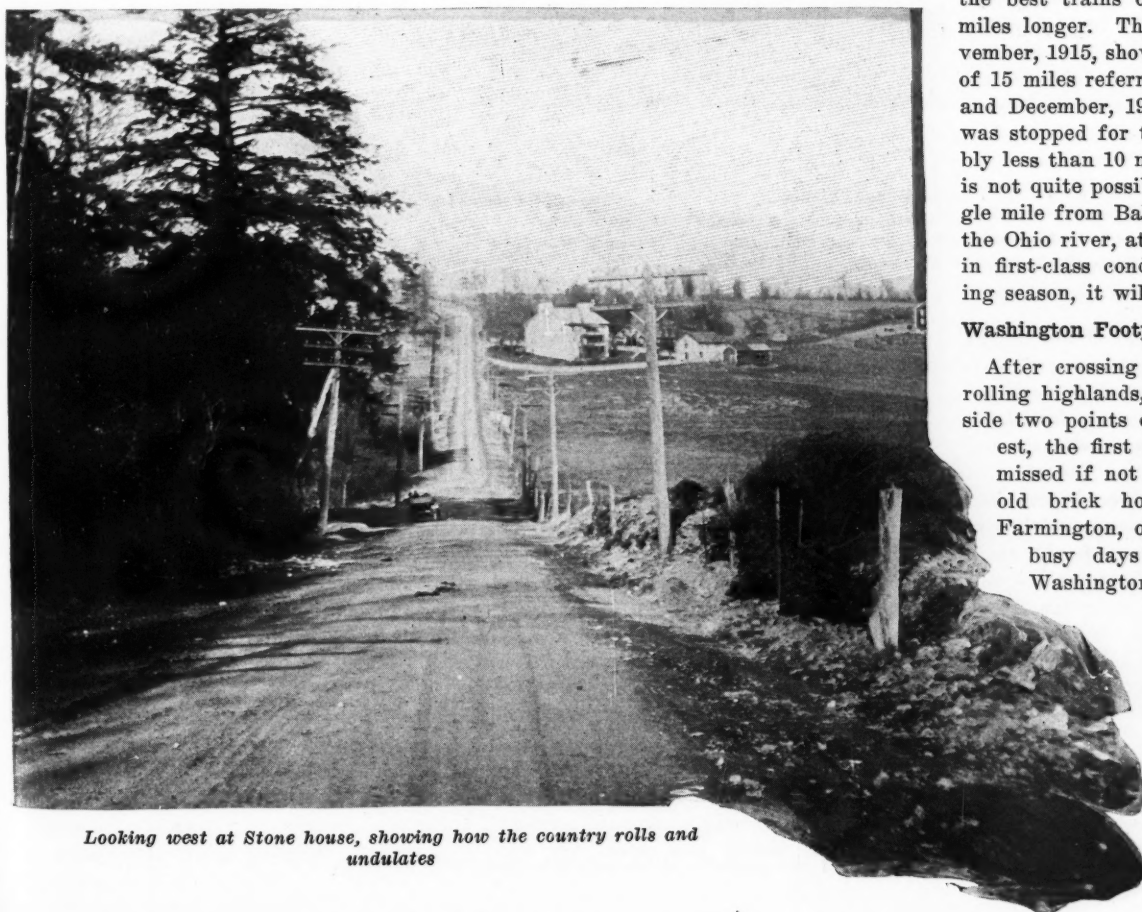
Map showing route of old National pike

Claysville and West Alexander; a total of 15 miles. The trip on which these observations were made was covered from Cum-

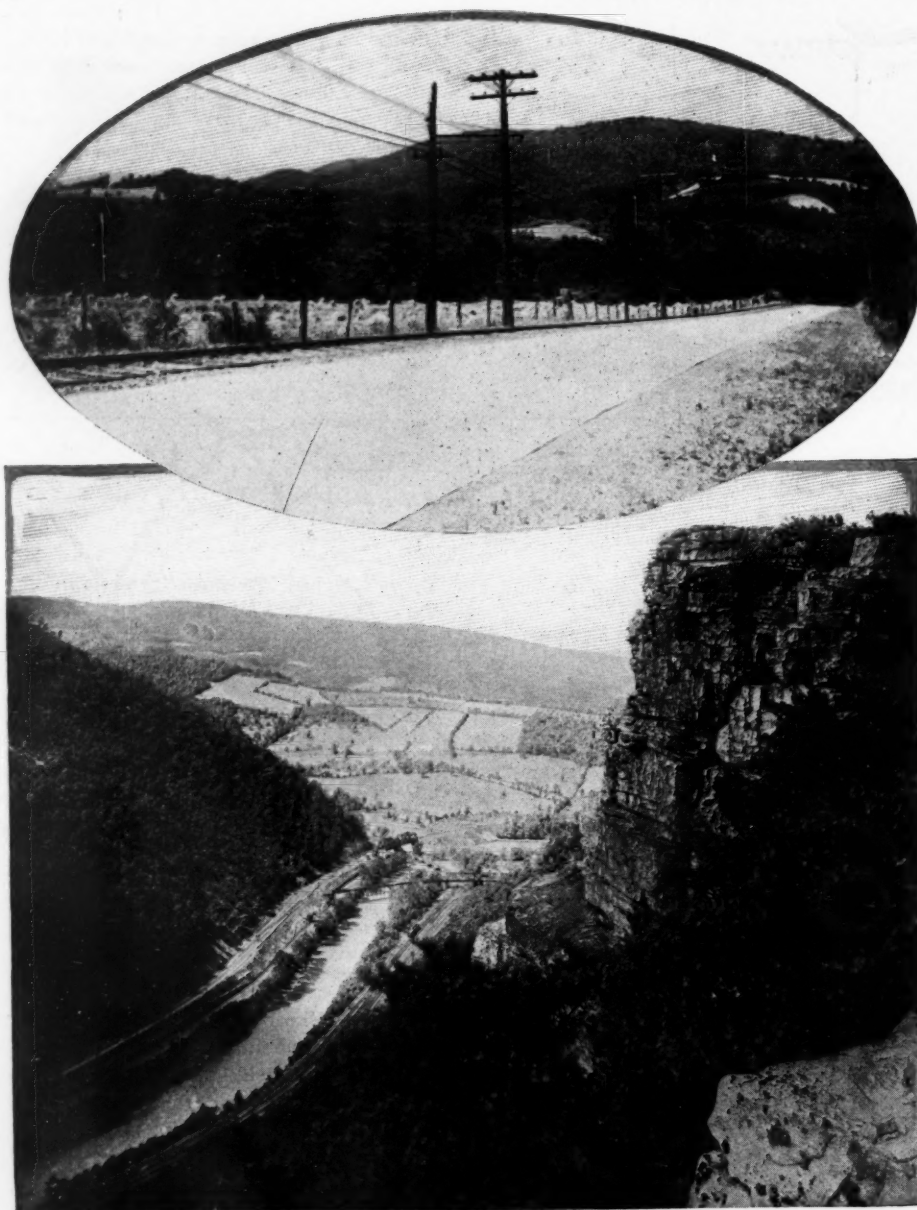
berland to Wheeling, 131 miles, fully half of it through mountainous country, in 5½ hours, or not much longer than it takes the best trains over a route at least 76 miles longer. The last trip, made in November, 1915, showed the mid-summer total of 15 miles referred to materially reduced, and December, 1915, about the time work was stopped for the winter, it was probably less than 10 miles. Therefore, while it is not quite possible to say that every single mile from Baltimore or Washington to the Ohio river, at Wheeling, will be found in first-class condition for the 1916 touring season, it will be practically so.

Washington Footprints

After crossing a fairly long stretch of rolling highlands, the tourist comes alongside two points of unusual historic interest, the first of which is likely to be missed if not watched for. This is an old brick hotel, 1¼ miles west of Farmington, on the left, known in the busy days of the pike as Mount Washington Tavern, built on lands once owned by the Father of His Country. But interest in the locality goes back to the earliest part of the French and Indian war, for it was in the fields just south of there that George Washington hastily



Looking west at Stone house, showing how the country rolls and undulates



Above—Section of concrete road on the National turnpike below the 6-mile house, west of Cumberland, Maryland

Below—View west through the famous Cumberland "Narrows," the easiest passage into the heart of the Alleghany mountains in its section of Appalachian America. Western Maryland railroad on the left, Baltimore and Ohio railroad on the right route of the National turnpike can be traced between Wills creek and the Western Maryland

constructed Fort Necessity when, as lieutenant-colonel of the Virginia militia, he was forced to give up the plan of Governor Dinwiddie to erect defences on the Monongahela and Ohio, and fall back before superior numbers of French and Indians.

Washington, who the year before had made the trip to Fort Duquesne with Gist as guide, was in advance of the main forces with 150 men, who were principally engaged in widening the Indian path, which up to that time had been scarcely broad enough for one man. The main supporting army—which set out from Wills creek, at Cumberland, in command of Colonel Joshua Fry—was a long time coming up, and meanwhile Colonel Fry was killed by a fall from his horse. Washington had first advanced as far as Mount Braddock, several miles north on the Union-

town-Connellsville route of today. But on account of his small force and the large number of French and Indians, he decided to retreat over the newly-cut road. Reaching the site of Fort Necessity, with his troops exhausted and in need of food, he found here—in the southern part of the Ligonier valley, east of the crest of Laurel hill—a well-watered meadow, and concluded to await reinforcements, in the meanwhile erecting a crude stockade fort for protection.

Soon the larger force of French and Indians, in command of Coulon de Villiers, surrounded the fort and opened battle, July 3. For 9 hours during a rainstorm, the colonial troops stood the siege; but when a considerable number of the defenders were killed or wounded, most of the horses and cattle lost, and ammunition became nearly exhausted, he, who

was afterward known as the Father of His Country, capitulated with the honors of war, whereupon the English flag was hauled down and the French run up. This was on July 4, 1754, Washington's first and only surrender, though in the Revolution more than 20 years later, he often tasted defeat.

Braddock's Death March

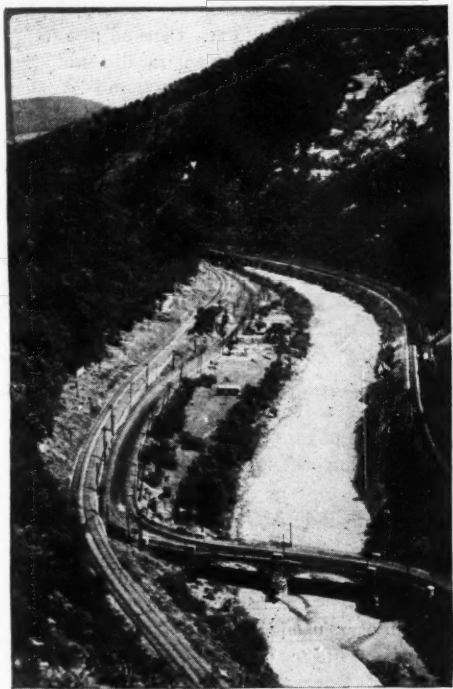
Braddock's army, which was organized to accomplish what Washington's small Virginia forces failed to do, passed westward across this section in 1755, by what is now known as the old Braddock road, but did not stop at Fort Necessity. It was no doubt pushing forward with the idea of a sure victory over the French at Fort Duquesne, though only about 1½ miles beyond Fort Necessity the pike comes alongside Braddock's grave, and we are reminded by the tablet on the monument that the disaster which befell that stubborn English general was far greater than Washington's defeat. About 4 miles beyond the grave and monument, the old road followed by Braddock's expedition turns northwest to Mt. Braddock, Connellsville, Mt. Pleasant and Pittsburgh, following a route largely abandoned today, though a number of traces of it still remain.

The English and colonial forces pursued their way to within 10 miles of Fort Duquesne, where the battle of the Monongahela was fought, resulting in their defeat by the French and Indians. Braddock was fatally wounded in the engagement and died on the retreat 3 days afterward. To prevent his remains being disturbed, he was hastily buried in the middle of the road, and Washington read the services over his body at daylight the following morning, July 14, 1755. The exact spot where Braddock was first buried is now marked by a tablet a few rods back of the monument. In 1804, when the workmen were engaged in repairing the old road, Thomas Faucet, who had been in the retreat of 1755, pointed out the place; Braddock's remains were then identified, taken up and reinterred at the present spot.

For a number of years the grave was enclosed by a board fence, within which were a number of pine trees. More recently the Braddock Memorial Park Association, composed largely of people in Uniontown and vicinity, purchased 23 acres, including the site of the grave, and began plans to erect a substantial memorial. As a result, a slightly monument was dedicated October 15, 1913, for which occasion the English government sent a special delegation, including the first British soldiers in uniform that had stepped on United States soil since the war of 1812.

Bridges Repaired or Rebuilt

After passing the Braddock grave and monument, the pike continues over Chestnut ridge or Laurel hill, making a long, beautiful descent to Uniontown, the most convenient stopping place for noon or



Cumberland Narrows, the gateway of the National pike to the west

night on that section of the route; thence to Brownsville, where a steep descent is made to the Monongahela river. The first considerable stream crossed on this trip through southwestern Pennsylvania is the

Youghiogheny, at Somerfield, a few miles west of the Maryland line. That river is a tributary of the Monongahela, the two uniting at McKeesport, Pa. For many years after the road passed from federal to a divided state control, the bridge at Somerfield was in bad condition. Like the pike, it has since been put in first-class shape. A new bridge was opened at Brownsville in 1914.

From Brownsville on, the territory crossed by the pike is less interesting from a historic standpoint, and less mountainous, as the prevailing slope is west toward the Ohio river. It is, however, a beautiful highland country. The tourist passes through Washington and Claysville, Pa., the latter named after Henry Clay, whose influence greatly helped to build the road.

The National pike enters the West Virginia Panhandle at West Alexander. The last 16 miles of the old pike in West Virginia have been kept in remarkably good shape for several years, some pieces of road being resurfaced in 1914 and 1915. The entrance into Wheeling is through its finest residential section, and, in running around the northern end of Wheeling hill, there are several fine views of the city and its environs, especially the broad Ohio, whose bottoms on one side are invariably opposite either steep or slowly-receding banks. Visitors from the east who have

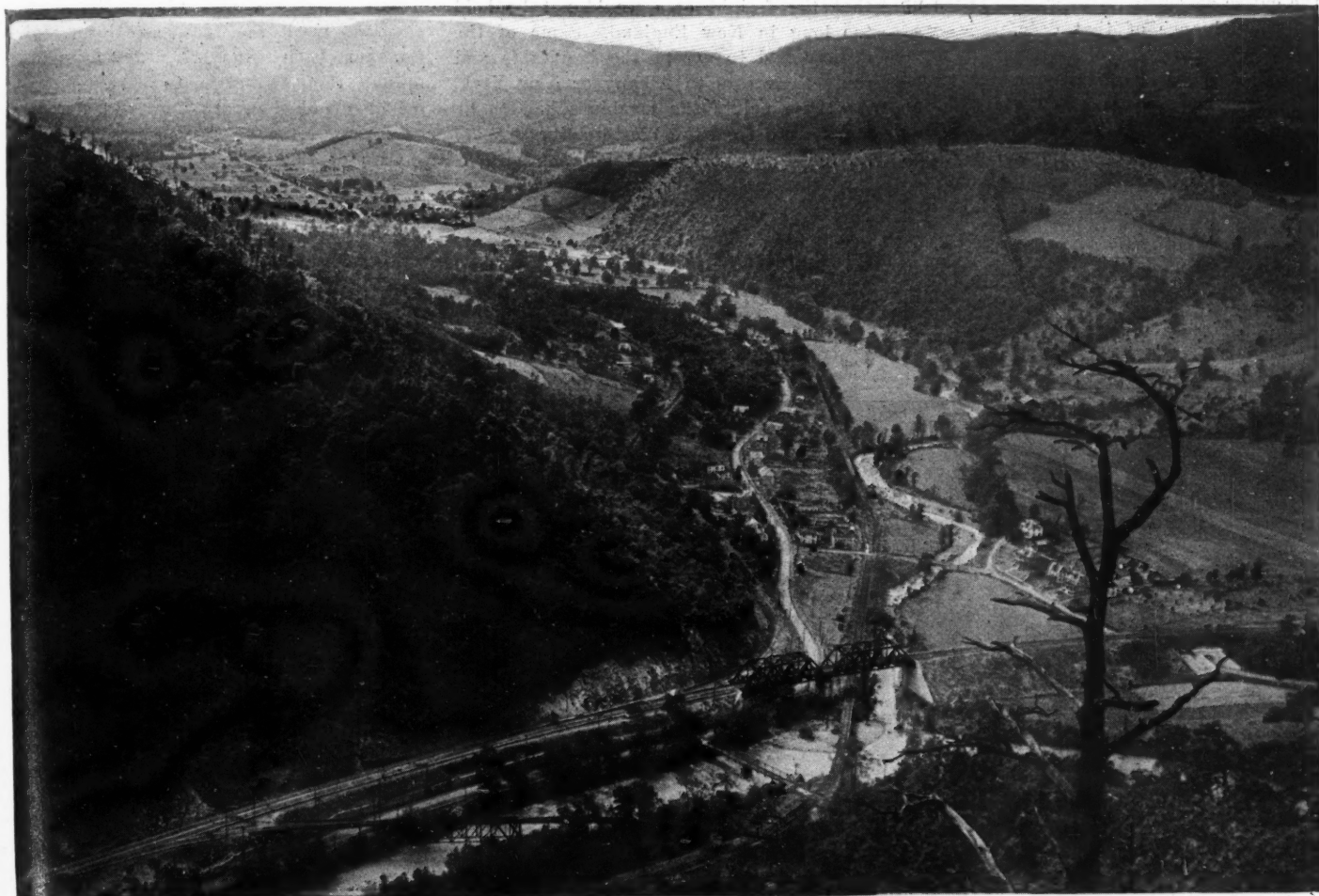
thought of Ohio as fairly level will be interested to look far to the west from the top of Wheeling hill and see a number of hills apparently as steep as any crossed since leaving Uniontown.

This trip across the eastern section of the National pike will be a better and more interesting one for motor tourists during 1916 than it has ever been before, and much more travel will go over it.

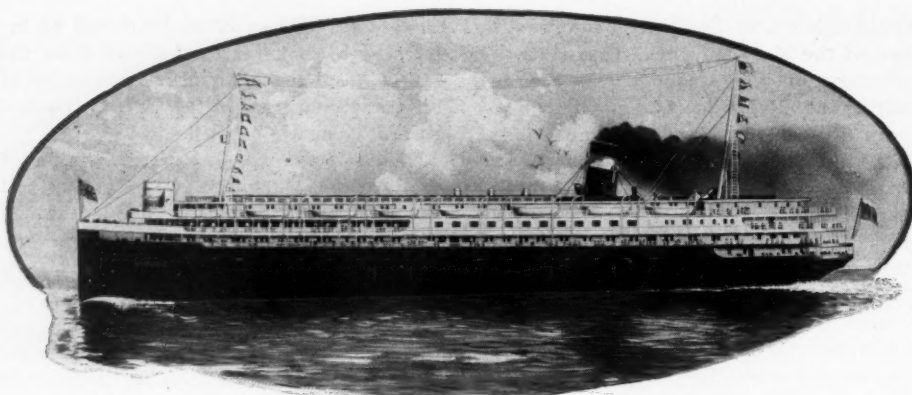
REGISTER CAR PROPERTY

Boston, Mass., April 15—"The danger of running an unregistered or improperly registered car or operating one in another state after the usual 10 days or longer of reciprocity time limit has expired, cannot be too emphatically pointed out, for such a motor car has been declared by the Supreme Court of Massachusetts as an outlaw and a trespasser upon the highway.

"In one case an improperly registered car was held to be in the same position that it would have been if it had not been registered at all. In that case the car collided with a railway engine under circumstances that would seem to indicate that the engineer was negligent. The car was damaged and the passengers were seriously injured, yet the court held that since the car was improperly registered it was an outlaw and a trespasser, and its owner as well as his guests could not recover damages.



View looking west from Wills mountain, showing route of the National pike



Steamer Noronic, which will carry Society of Automobile Engineers on its annual cruise of the Great Lakes

Many Engineers Plan Summer Cruise

Two Hundred Forty-six Members S. A. E. Already Have Reserved Berths for 4-Day Trip

DETROIT, Mich., April 18—Two hundred and forty-six individual reservations have been made to date for the summer outing on Lake Huron and Georgian Bay, of the Society of Automobile Engineers. The trip will be made on Steamship Noronic, which accommodates 550 persons. With practically half of the reservations already made, and the trip not starting before June 12, it is certain that the entire accommodation will be taken up well in advance of that date.

The program will include papers on aeroplane motors, and others on motor transport for the army, agricultural tractors, kerosene carburetion, lessons learned from use of motor trucks in European war, etc.

Business and pleasure will be combined on a 4-day excursion around the lake and in Georgian bay.

NEW ENGLAND FREIGHT SITUATION

Boston, Mass., April 15—Increased freight rates for the buyers of motor cars is the latest thing that some of the pur-

chasers of cars in New England face now and have been facing for a few weeks. The freight embargo presented a new angle when some of the Boston dealers were told that the railroads would not route their machines through to Boston and other New England cities direct.

They were told that New York and Albany would be the limit because of the need of cars, and also to insure, probably, that the freight cars would not be held too long in New England. Some of the dealers had to accept the inevitable and route their cars to Albany or New York. At those points the machines had to be transferred from the Western lines to cars of the New York, New Haven & Hartford, Boston & Maine and Boston & Albany railroads.

That necessitated hiring men there to make the shift. In some cases fenders had to be taken off to get the cars into smaller freight cars that had no end doors. When the machines reached Boston there was the work of putting the cars together

again. On some of the machines the freight charges have represented about \$20 more. Some of the dealers did not feel like adding this to the cost and so they cut it in two standing half of it themselves. Others paid the entire excess freight over the normal. The dealers do not like to talk about it because they feel prospective buyers will be scared away. The cars that come on the gondola flat cars provided with canvas covers and frames are costing some of the dealers a little more, in some cases the cost of the covers being charged to them, but when they are returned they are allowed a rebate. In a few instances buyers have agreed to pay express charges to get cars quickly, but they are very few.

DUESENBERG MOVING TO CHICAGO

Chicago, April 18—The Duesenberg Motor Co. which has manufactured the Duesenberg racing cars and also the Duesenberg motor used in a great many racing machines other than those carrying the name of Duesenberg will move from St. Paul, Minn., its present location, to 2259 Oakdale avenue, Chicago. F. S. Duesenberg, president and general manager of the organization, who has been responsible for the development of these racing motors, will continue to handle the entire affairs of the company.

A THREE-FUEL TEST

San Francisco, Cal., April 15—During the last week the Maxwell Motor Sales Co. has been conducting tests in and around San Francisco to determine the merits of alcohol, gasoline, and kerosene as fuels.

Cars of 1916 Maxwell type were used, no changes being allowed in any equipment or carbureter, except that the feed lines for both the alcohol and kerosene were wrapped around the exhaust pipe to facilitate combustion. Also, a gasoline primer was allowed for starting purposes when kerosene was used.

A trip of 115 miles was made, as a re-



Salon and dining room of steamer Noronic, which will carry motor engineers on Great Lakes cruise

sult of which the official observers reported that the car with the gasoline made 24.6 miles to the gallon; the one with the kerosene made 15.1 miles to the gallon; and the third car, which used alcohol, made 29.3 miles. The cost of the coal oil was 9 cents, of the gasoline 18 cents, and of the alcohol 73 cents a gallon, so that the excellent showing of the alcohol in distance per gallon is more than counterbalanced by the high cost of the fuel.

WILLARD REACHES MILLION MARK

Cleveland, O., April 15—The total production up to and including April 8 of the Willard Storage Battery Co. is 1,000,000. This means that more than 850,000 car owners are using Willard batteries for starting and lighting. There are 725 Willard service stations throughout the country in which the company has originated a unique plan of giving free inspection once every month to any car owner regardless of the battery he uses.

MARCH HUPP'S BIGGEST MONTH

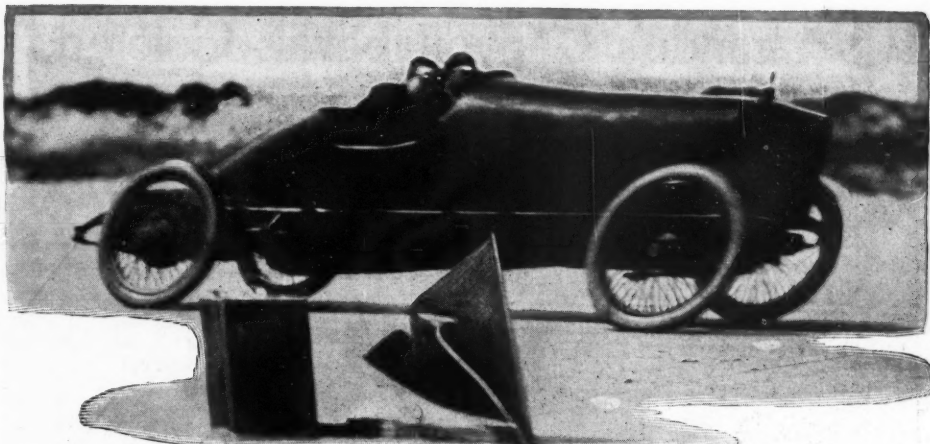
Detroit, Mich., April 15—March was the biggest month in the Hupp Motor Car Corp.'s history. Production was 69 per cent ahead of the total in March, 1915. For the first quarter of this year there was an increase in business of 70 per cent over the business done during the corresponding period in 1915.

IOWA MOTORISTS SAVED MONEY

Des Moines, Ia., April 15—Ten thousand dollars was saved car owners of Iowa when it was decided that no penalty should be charged against owners who mailed checks to pay their license fees before April 1. The law requires that the fees shall be paid on or before April 1 and a penalty of 10 per cent is to be exacted from those who are delinquent.

Checks were received on April 1 from 10,000 owners and the state department ruled that they should be accepted and licenses issued without penalty. Checks from 10,000 more motorists of the state were received on April 3 and they were sent back with polite requests for large enough checks to cover the penalty as well as the license.

The total number of cars registered in



Ralph Mulford, doing 102.5 miles per hour in the stock chassis Hudson Super-Six at Ormond-
Daytona beach

the state up to April 1 was over 132,000 as compared with 147,078 for the entire year of 1915. The total registrations April 1 were over 55,000 greater than the total at the same time in 1915, indicating a registration of at least 175,000 for the entire year if the record of last year for gain is duplicated. The state motor fund for the year already amounts to \$1,157,411.

McFARLAN PRICE NOW \$3,200

Connersville, Ind., April 15—The McFarlan Motor Co. announces that after May 1 the touring car will be built in the series X only and will list at \$3,200, whereas the old price was \$2,990. Two models of sixes have been built in six-cylinder type which is the only kind this company manufactures.

MOTOR SAVES FACTORY SHUTDOWN

Flint, Mich., April 14—A flood in the Dort factory was averted this week by two Dort engines attached to a large centrifugal force pump which were kept constantly active to remove the water coming into the factory when the Flint river rose to a height of 15 feet above its normal level. The factory was shut down for only 2 hours after which the entire force came back to work.

WINTON RAISES PRICE \$200

Cleveland, O., April 17—The Winton company has announced a raise in the price of its model 33 of \$200 effective May 1.

This means that the price on five-passenger touring cars will be \$2,485. Several body styles are built on this one chassis and the price raise of \$200 applies to all types of bodies using the model 33 chassis.

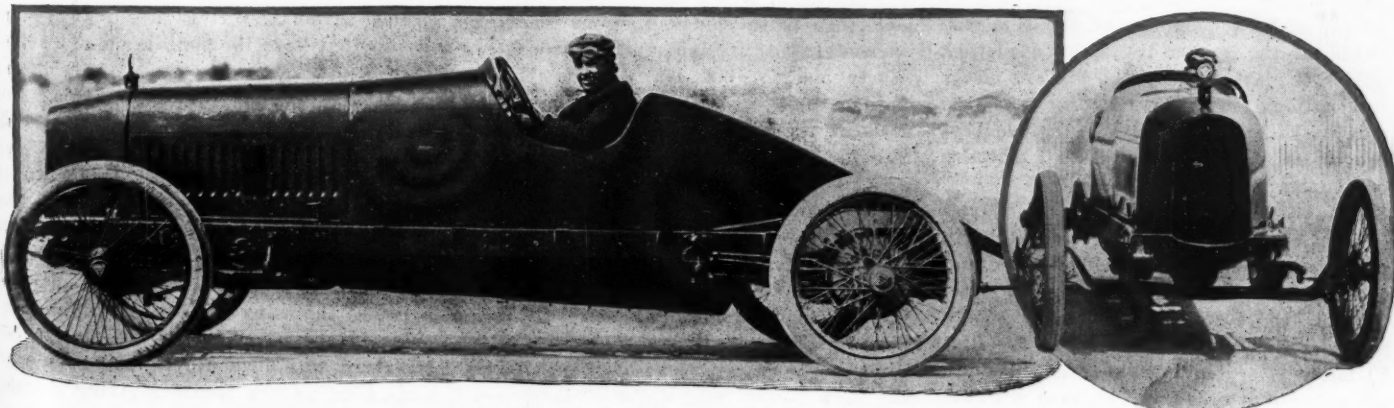
The company says it has protected itself as far as possible and hopes to get through the year without increasing prices, but that the cost figures are constantly increasing, it may be that another increase will be necessary before the year is over.

CLYDE TRUCK PLANNED

New York, April 15—The Clyde Motor Truck Co., which was incorporated last month in Delaware with a capital of \$750,000, of which \$250,000 is preferred and the balance common stock with a par value of \$10, has acquired a plant in the motor car district of Long Island City, near Woodside. It is expected that deliveries on its 1-ton truck, selling at \$1,000, will begin in July. The purpose of the company is to assemble this truck exclusively. It is equipped with a Buda engine.

OTTAWA DEALERS SELL 525 CARS

Ottawa, Ont., April 15—Dealers in this district sold 525 cars last year and it is estimated that this number will be doubled during 1916 and a car census taken last year showed that in Ottawa and in the district immediately tributary were 1,427 cars of which 500 were Fords.



Two views of the stock chassis Hudson and its driver, Ralph Mulford

Rio Grande's Canyon Rivals Colorado's



Ninety Miles from Nearest Railroad Station, but Much of Interest Is to Be Found In This Picturesque Section

By W. D. Hornaday

IT is 90 miles from Terlingua, Tex., to the nearest railroad point. The road from Alpine or Marfa to that border town is long and parts of it rough, but the trip and what it leads to are well worth while to one who has an eye and sentiment for the wonderful and impressive works of nature—not that there is any scenery of moment along the route, but just below Terlingua is the beginning of the canyon of the Rio Grande that is exceeded only in grandeur and beauty by the Grand canyon of the Colorado in Arizona.

For some time the question of connecting the district of scenic wonders that lies in the southern part of the Big Bend region of Texas with the outside world by a system of motor roads has been agitated. As yet this movement has not resolved itself into anything tangible, but it is expected that something definite towards accomplishing the purpose will be done in the near future. Probably not one hundred people of Texas, outside of the few residents of the region itself, have viewed, during the last 10 years, the canyons of the international boundary stream and the many wonderful creations of nature that are to be found in the remote mountains of the border.

Solitude and Waste

Even the journey through the semi-arid country that lies between Terlingua and the Southern Pacific Railroad is not without its deep interest to the lover of the solitudes and waste places. For the first 50 miles after leaving the railroad there are a few scattered ranches, each with its little oasis of irrigated plots, and perhaps

Above is a sample of the scenery around Terlingua, and in the circle is an old adobe house, many of which are found along the border

orchards of apple and other fruit trees, but gradually the aridity of the land becomes more and more pronounced and the last stage of the trip is through an unoccupied and barren region of alkali flats which are broken here and there with water courses, along which straggling, thorny vegetation grows. The banks of these little creeks become more abrupt as they near the Rio Grande and some of them are resolved into awe-inspiring canyons where they empty into the river.

It is in the caves and brush that line the arroyos and canyons that wild animals are found in great numbers. Black bears are numerous, and in the vicinity of the water holes are found many deer of the black-tail variety. The rough and dismal recesses of the canyons are the haunts of Mexican panthers, wildcats which often are of enormous size, and ferocious wolves.

For 50 miles surrounding the little town of Terlingua, which latter place owes its existence to the quicksilver mines of the immediate locality, human habitations are scarce and far between. Along the Rio Grande there are a few Mexican settlements, which have a picturesqueness that is quite distinct from the ordinary villages of those people. The inhabitants of the river communities seem to have retained many of the quaint customs and mysterious rites that were handed down to them from the Aztecs or perhaps the Toltecs. It is claimed by educated Americans who have mingled more or less with these primitive people that in some of their villages the pure Aztec language still is spoken. If this statement is true the inhabitants

would afford an interesting study on the part of ethnologists.

Their religious observances are different from the Mexicans of any other part of Mexico, it is stated. Their talk is rich in folk-lore. At certain times of the year they conduct a period of worship on the tops of neighboring mountains, where fires are kept burning and sacrifices are offered in the way of slaughtered goats and sheep. Few of these simple-minded people have any knowledge of the outside world. The person among them who has the good fortune to have seen a railroad train, an electric light, motor car, or any of the other modern inventions that enter so largely into the life of the great world that lies beyond their limited vision is looked upon by them as belonging to another sphere of life; they do not take much interest in what they are told about these great inventions; it is all quite beyond their comprehension. What is more important to them is whether Juanita or Jose has brought enough water from the river upon the back of the patient burro to last until tomorrow. But even this thought is not a disturbing one. *Manana*—tomorrow—will take care of itself, what's the use of worrying!

The raging torrent of water that sweeps through the canyon of the Rio Grande has been braved by but few men. It is stated that only two trips by boat ever have been made through the deep and terror-inspiring gorge. Prof. Robert T. Hill, former state geologist of Texas, has the distinction of exploring the canyon by means of a boat voyage about 15 years ago. He and his Mexican companion had many narrow escapes from death in the rapids and whirlpools they encountered. In places the walls of the main canyon rise to the precipitous height of 1,500 feet and the gorge is so narrow that a rock can be thrown from one side to the other. For more than 200 miles the river flows between the high rock barriers that shut out the sun and dull the sound of the riotous waters that flow through the dismal depth of the chasm. At intervals the intercepting water courses break through the wall and it is at these places that there is to be seen the magnificence of the scenery of the canyon as viewed from below.

Echo From the Past

Back from the river are many giant buttes that have the appearance of ancient castles. A few miles west of Terlingua is situated one of these upheavals. For some distance around it the country is almost level. That the great butte, which rises to a height of nearly 1,000 feet, once was used for some purpose or other by the prehistoric inhabitants of the region is shown by the recent discovery upon its plateau-like top, which covers several acres, of the ruins of a stone building, circular in shape. Whether this tower-like structure was once a religious temple of some kind or was used for giving signals, or some other purpose, is altogether a mat-

ter of conjecture at this time. From the vantage top of the butte a commanding view of the country for 50 miles around can be had. Quite a collection of ancient pottery, stone implements and other relics were found in and near the ruins of the building.

Access to the top of the giant rock was obtained by accident by John T. Warren, a Government topographer, who was making a survey of that part of the border. He was seeking a place to locate his engineering instrument when he came across what appeared to be the entrance to a cave on one side of the butte. He entered and was surprised to find that a flight of steps, cut into the stone, led out of the end of the chamber. For perhaps 50 feet the passage was carved through solid rock. The steps then came out on one corner of the butte and in circular fashion they mounted to the top. Mr. Warren and members of his party made a thorough exploration of the top and sides of the wonderful rock, but they found nothing of moment except the ruins of the stone building and the relics of a by-gone race.

Can Motor to Many Places

It is possible to make a motor trip to nearly all the chief points of interest in this little-known region. The mountains that lie to the east and west of the district of alkali flats are of themselves replete with interest. Some of the peaks of the Chisos, the Chinati and other ranges rise to more than 7,000 feet in altitude. The higher reaches of the mountains are covered with a dense forest of pine and oak trees. In the Chinati mountains, at an elevation of 7,000 feet, is a large lake of pure, crystal water. It is teeming with gamey fish; but few ever have been caught because it is only at rare intervals that a sportsman visits the remote spot.

In the earlier days, when the Big Bend region was the rendezvous of fugitive outlaws, who had fled into the isolated border region to evade capture at the hands of Texas rangers, it was dangerous for a peace-loving and unprotected white man to venture into the strange wilds. It was through the vigorous and daring work of the rangers that the country was cleared of its desperate characters. Many of the bad men were killed, others fled into Mexico and some were captured and duly punished. For the last 15 or 20 years but little lawlessness has been committed in the Big Bend. Even the operations of smugglers and cattle thieves have been reduced to a minimum. The rangers and other peace officers know every one of the roads and trails and the evildoer stands small chance of escaping these guardians, should he commit a violation of the law.

If the interesting region is opened to motor car tourists as is now proposed, the new highway system will be extended north through the Davis mountains and the lower part of the Texas panhandle to a connection with the Borderland route that already is open to travel.

Answers to Inquiries for Route Information

Danville, Ill.-Murphy, N. C.

AUGUSTA, Ill.—Editor Motor Age—What is the best route from Danville, Ill., to Murphy, N. C.? We are planning to go some time in June and would like to know what time of the month would be the best time. Also, what is the condition of the roads at that time? Would prefer not to go via Indianapolis, but would like to go on the best roads.—S. E. McKeefee.

On your trip to Murphy, N. C., the best routing from Danville, Ill., is to go over the Crawfordsville and Indianapolis, then down through Columbus and Seymour to Louisville; through Care City, and Springfield, to Nashville. The better road from Nashville to Chattanooga goes over Huntsville. This is quite a bit longer than the short road, but the short road can only be negotiated in very good weather.

From Chattanooga to Murphy the roads are not very good, but you probably could get through by going through the following towns: Ooltewah, Cleveland, Calhoun, southeast to Hambright, and Apalachia, and then continue up the valley of the Hiawasee river to Murphy.

At this time of the year after you get into Indiana, and down to Chattanooga you should have good roads and no difficulty in getting over them, but between Chattanooga and Murphy you are liable to strike bad conditions at almost any time of the year, but especially so in the spring because of the spring rains.

Volumes 4 and 6 of the Blue Book will give you complete routing to Chattanooga.

Amarillo, Tex.-Asheville, N. C.

Amarillo, Tex.—Editor Motor Age—Give me the best route from Amarillo, Tex., to Asheville, N. C., via Franklin, Ky.—S. P. Vineyard.

On your trip to Asheville, N. C., your best routing is to go through Childress and Wichita Falls to Fort Worth and then over to Dallas, and through Texarkana, Hot Springs, Little Rock and Forest City to Memphis. From Memphis go up to Brownsville, then to Jackson through Huntingdon, Camden, Dickson and Nashville. From Nashville go up to Springfield and Adairville. There is a pretty fair road from Adairville over to Franklin. To go to Asheville

you will have to come back to Nashville and then go through Murfreesboro. In dry weather you can go from here straight to Chattanooga, that is through Manchester and Tracy City, but if the weather is at all bad you will have to go quite a bit out of your way, that is down to Huntsville, then up to Jasper, then over to Chattanooga. From Chattanooga go north to Grayville, Rockwood then over to Lenoir City, then up to Knoxville. From Knoxville go to Jefferson City, Newport, and Hot Springs, then down to Asheville.

The direct road, Murfreesboro over to Knoxville, is under construction and we doubt if you could get over.

Volumes 5 and 6 of the 1916 edition of the Blue Book will give you complete routing for your trip.

Jermyn, Tex.-Cairo, Ill.

Jermyn, Tex.—Editor Motor Age—I am planning a trip from Jermyn, Tex., to Cairo, Ill., or west Kentucky, and would like to know if you have a copy of the most feasible and best route, if so, price, etc.—J. W. Hopper.

On your trip to Cairo, Ill., believe you will find it better to come north to Wichita Falls and then go through Lawton, El Reno, up to Wichita and Newton. At Newton turn east through Florence and Emporia, Ottawa and Olathe into Kansas City. From Kansas City take the north route to Marshall going through Independence and Dover, then down to Boonville, where you take the ferry and then go east to Columbus and St. Louis. From St. Louis turn south through Murphysboro and Anna to Cairo.

This may seem to you a little bit roundabout, but it is the only way to get there over good roads.

Volume 5 of the Blue Book will give routing from Wichita Falls to St. Louis; volume 4, St. Louis to Cairo.

Mybo, N. D.-Hale, Mo.

Mybo, N. D.—Editor Motor Age—Would like the best touring route from Devil's Lake, N. D., to Hale, Mo., thence from Hale to Ashland, Neb., and return to Devil's Lake. State the total mileage.—G. S. Lewis.

On your trip from Devil's Lake, N. D., advise going to Grand Forks and then turning south to Farge, White Rock, Ortonville, Brookings, Sioux Falls, Sioux City, Omaha, St. Joseph. From St. Joseph go through Cameron, Chillicothe, then south to Hale.

Going to Ashland, Neb., from Hale retrace your route through Chillicothe and Cameron to St. Joseph then west through Hiawatha, Sebetha, Seneca and Axtell to Marysville. From there you go north through Beatrice to Lincoln, and then through Waverly to Ashland.

Ashland back to Devil's Lake, go over to Omaha, then retrace the going trip through Sioux City, Sioux Falls, Brookings, Ortonville, White Rock to Farge, then west to Devil's Lake.

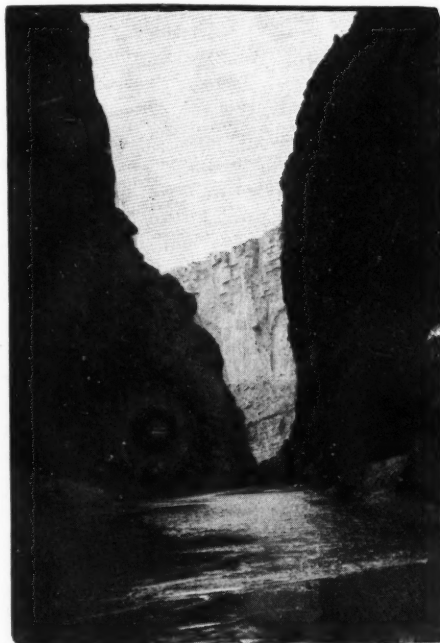
The mileage for this trip will be between 1,800 and 1,900 miles.

Shreveport, La.-Hot Springs, Ark.

Shreveport, La.—Editor Motor Age—Kindly give me the best route from Shreveport to Hot Springs, Ark., and from Shreveport to Dallas, Tex.—J. B. Herold.

The best route from Shreveport to Hot Springs is straight north to Texarkana, going through Dixie, Gilliam, Myra, Doddridge, and Fort Linn, then from Texarkana go through Fulton, Hope, Prescott, Arkadelphia, Bismahk to Hot Springs.

The best routing between Shreveport and Dallas is to go through Greenville, Longview, Gladewater, Starrville, Winona, Tyler, Edom and Willspoint.



View of the grand canyon of the Rio Grande

Tires, Their Care and Repair—Part III

Inflation Pressure, Load Per Tire and Dependability of Garage Gauges—Reliable Data from Manufacturers

Herewith is printed the third installment of a series on the care and repair of tires, the first of which appeared in the April 6th issue of Motor Age. The present installment explains in detail the proper inflation pressure, load per tire recommended, and the inadvisability of running tire at low pressure for hot weather as told by tire makers

ONE of the tire manufacturers opens its book of instructions to motorists on tire care with a comparison between a motor car engine and the tire, making the point that no engine is guaranteed to work satisfactorily without sufficient oil, and no tire, no matter how well made, should be expected to give its best service or its proper mileage without being pumped up to the proper point. Air is as necessary to tire service as lubrication is to motor service.

In order to impress this need of inflation upon motorists and to get the exact status of what effect different weather conditions have upon tire inflation, Motor Age has asked a number of tire manufacturers to submit their views upon four questions. These are:

1—The proper inflation pressure for the various tire sizes?

2—The load per tire recommended and the proper pressure of tires under these loads?

3—Should the tires be carried at less pressure for a long drive on a hot day than is recommended for the tire on a cold day? That is, is the increase in pressure caused by increase in temperature sufficient to be taken into account in determining the inflation pressure?

4—Are the tire gauges that the car owner has to use in different garages sufficiently accurate to be relied upon? What precautions should the owner take to be sure he is getting the desired inflation?

Tire manufacturers have responded very willingly in answering these questions and they are almost a unit in their appreciation of the opportunity to assist Motor Age in the dispensing of the tire inflation gospel. The one fact that is brought out most forcibly is that the weight on the tire is a chief factor in determining its proper inflation pressure. The motorist must take the load on his tires into consideration when determining the pressure to which they are to be pumped up rather than endeavoring to keep them to any definite pressure regardless of the weight carried.

Twenty Pounds Per Inch

True enough, there is a very convenient rule of thumb method by which the inflation pressure can be determined with fair accuracy for any tire under ordinary loads. This method is one that is more widely known than observed. It is as follows:

Pump the tires to 20 pounds for each inch of cross-sectional diameter. That is,

a 3-inch tire should carry 60 pounds, a 4-inch tire, 80 pounds, and so on.

While this is a good general rule, it cannot be relied upon to give sufficient inflation, on the one hand, when very heavy loads are carried, nor sufficient easy riding, on the other hand, when the car is overtired or the weight per tire is considerably under the normal.

The pressure to which a tire should be inflated depends upon the maximum allowable deflection of the tire under load, that is, the degree to which it flattens out at

TIRE MOTTOES FROM TIRE MAKERS

It is under-inflation, not over-inflation, that should be guarded against.

* *

It has been definitely determined that it is impossible to obtain an increase in pressure, due to overheating a tire while running enough to injure it.

* *

A rise of a few pounds' pressure due to running will not hurt any tire, but lessening the pressure brings it to an early death.

* *

The average owner would get 35 per cent more mileage from his tires if he would inflate them properly.

its point of contact with the ground. This deflection varies directly as the load carried and inversely as the pressure within the tire. That is, the greater the load the greater the deflection with the same pressure and the greater the pressure the less the deflection with the same load. Consequently, within limits, it is possible to make up for increased load by increasing the air pressure. This is the basis upon which most of the tire inflation tables are written. For certain specified loads, a given tire must have a certain specified pressure.

Instead of determining by tests the proper tire inflation for a given load and leaving to the owner to determine the load on the tire for himself and then find from the table the proper pressure to prevent deflection, the Goodrich company has developed an instrument which it calls a tire caliper by which the owner can read the deflection directly and thus inflate the tire to a point at which it shows the allowable deflection when the caliper is applied.

This, then, takes the place of the weighing operation to determine the load on the tire, the tire table to determine the proper inflation and the air-pressure gauge to make sure that the proper inflation is obtained.

In the matter of tire gauges, they can be considered quite reliable if properly cared for. Whether or not the tire gauge which is used by every Tom, Dick and Harry that avails himself of the garage's air system is reliable in every instance is questionable. To be on the safe side, the owner should carry his own tire gauge and should keep the stem free from dirt. If not permitted to get foreign matter in the stem or banged around with the tools, it is pretty sure to be reliable. The occasional checking up with other gauges is recommended. It pays to buy a rather good gauge as some of the cheapest ones are not likely always to be uniform in their reading.

Between Two Evils

The owner inevitably has the question of sufficient air pressure to give long life to tires, on the one hand, and not too great pressure to give easy riding on the other hand, and motorists are prone to allow their tires to run a little bit under the proper pressure for the sake of easier riding qualities. When this is done, the motorist simply is utilizing his tire to perform the functions that the springs and shock absorbers should perform. Tires are not meant to do this work. Rubber and fabric cannot take the place of steel. When the tire casing is allowed to run soft enough to take up the road shocks that the springs should absorb, there is a constant flexing of tread and fabric which inevitably will cause disintegration and separation between the layers, and which in time will result in the utter destruction of the body of the tire.

If, for the sake of easy riding, it is desired to carry the tire at somewhat less pressure than that recommended by the tire maker, this can be done, within limits, by using oversize tires. By this term is meant tires which fit the same rims as the regular tires but which are designed to give a larger capacity of air and thus provide a greater volume of air cushion. Oversize tires, of which a table is published herewith, are ½-inch larger in cross-section and 1-inch larger in overall diameter than the regular tire. These tires, as a general rule, pay for their slight additional cost in the increased mileage that may be obtained from them and also in

easier riding qualities obtained in the motor car.

Tire manufacturers are almost unanimous in stating that their tests have shown that a great deal more damage to the tire is occasioned by endeavoring to compensate for the difference in pressure caused by increase in temperature of the tire through lower inflation in the summer time than would be caused by such increase in pressure itself. This increase is so slight that it need not be taken into consideration. It is almost negligible from the viewpoint of the car owner.

The tensile strength of a single layer of

17½-ounce sea-island fabric is approximately 480 pounds to the square inch. In a 5-inch tire, where seven layers of fabric are used, the tensile strength of the carcass is in excess of 3,000 pounds to the square inch and in a perfectly built tire it would require this amount of hydraulic pressure to blow it out.

Experiments along this line have been conducted in which over 2,000 pounds of air have been placed in a tire and the iron rim itself has given away before the tire, and the hydraulic pumps have broken down before the pressure in the tire being subjected to the tests has given away.

What the Tire Makers Say

Goodyear

AKRON, O., Editor Motor Age—Your idea to give motorists a more intimate knowledge of the importance of inflation in tires is certainly a good one because there is nothing on which good service from tires is so dependent as that the proper amount of air pressure be maintained in them.

The most important thing to fix in mind on the subject is that load as well as inflation must be considered to get good results. These two factors are interdependent. You cannot consider one properly without regarding the other.

Every tire is made to operate best considering easy riding and durability with a certain degree of flattening. If you increase the load imposed on a given tire you must increase the inflation pressure—and vice versa—if you are to maintain this proper degree of flattening.

From this it will be seen that there is no fixed pressure that can be set as standard for any size of tire regardless of load.

Therefore, each motorist should determine for himself what is the proper inflation for his tires. The only way to do this is to weigh his own car and then determine from the schedule below what is the proper inflation for both front and rear tires.

In this way you can be certain that you are operating your tires at a pressure that is scientifically correct and not by an arbitrary, fixed pressure, or by guesswork. The table herewith shows the pressures recommended for different loads.

Before the pressure drops 20 per cent the tire should be pumped up again.

Weigh the front and rear of the fully loaded car separately and divide by two. Look in the column headed by the tire section size for the load which most nearly approaches the actual load carried. The proper pressure is one of the figures in the extreme left-hand column, depending on whether fabric or cord tires are used. If the load on the front tires is less than on the rear, the front tires may be inflated to correspondingly less pressure. The ideal load for the best all around results under average conditions is underlined in each column. A load in excess of this may be carried as shown by the higher figures, but the resulting pressure necessary to get good tire mileage is usually very hard on the car and its occupants. A tire should never be given a load in excess of the maximum figures at the bottom of each column.

That the inflation pressure should vary in tires of a given size according to the load they are obliged to carry is obvious when you consider, for instance, a 4-inch tire used on a heavy touring car and another 4-inch tire used on a light roadster. Obviously the weight on the former is a great deal more

than that on the latter, so that the former tire will be flattened or distorted a great deal more, providing the pressure is the same. In order to prevent this flattening from becoming abnormal and in that way affecting the tire detrimentally it will be necessary to maintain a higher inflation pressure in the touring car than used in the tires on the light roadster.

The primary purpose of a pneumatic tire is to act as a container for air which supports the weight of the car and to provide a cushion to absorb the shocks met in driving and thus develop the quality of easier riding.

If the tire is inflated so that it does not flatten at all under the load more service will probably be received from it. However, this will cause the car to ride harder.

If the tire is underinflated, that is, if the amount of air allows too great a degree of flattening, the constant distortion at its

OVERSIZE TIRES

Tire	Rim	Tire	Rim
31x3½ Flts	30x3	35x4½ Flts	34x4
31x4 " "	30x3½	37x4½ " "	36x4
33x4 " "	32x3½	37x5½ " "	36x5
35x4 " "	34x3½	37x5 " "	36x4½
33x4½ " "	32x4	35x5 " "	34x4½

point of contact with the ground as the wheel revolves will generate heat in the side walls of the tire. This heat destroys the rubber between the individual plies of fabric and tends to separate them. Separation of this kind weakens the tire so it is not long able to stand up under ordinary road conditions.

This explanation applies to straight side or quick-detachable clincher tires. In regular clincher tires, underinflation generally results in rim cutting because the weight imposed upon the improperly inflated tire causes the lower part of the side wall to chafe against the metal rim until this cutting action penetrates the plies of fabric. After that, of course, that part of the tire becomes so weak that a blowout results.

With the facilities which most garages and supply stores offer at the present time it is exceedingly easy to maintain the proper amount of air pressure in tires. The motorist will find that giving a little care and attention to this item will be the means of greatly increasing the service he ordinarily gets. It means increased mileage and hence reduced tire bills.

If it is desired to increase the durability or mileage from the tires, the inflation pressure should be increased. In extreme cases where better cushioning effect is desired this can be done by decreasing the inflation pressure. However, that is bound to cut down the mileage received from the tire. The best way to get better cushioning is to change to oversize tires because in that case a lower inflation pressure can be used. For instance:

Suppose that a 4-inch tire carrying a weight of 1,000 pounds per wheel should according to the above scale, be inflated to 80 pounds. If the motorist found he wished easier riding, the best thing he could do would be to change over to 4½-inch tires, which with a load of 1,000 pounds would need to be inflated to only about 70 pounds.

The big thing to remember in connection with proper inflation in tires is that it is underinflation and not overinflation that ought to be guarded against. As a matter of fact, our tires can be inflated to an amount surprisingly above the recommended pressure without affecting them detrimentally. For instance, we have several times here at our factory inflated tires to 300 pounds, at which pressure the rim and not the tire gave way.

The subject of whether or not inflation pressure in tires should be reduced in hot weather is a very interesting one, because it is generally supposed the pressure should be reduced in the summer time.

We have made exhaustive tests on this and have found that the increase in air pressure on account of a rise in temperature of the weather is practically negligible, for instance:

In a test made with a 33 by 4 tire on the hottest day ever recorded here in June, we found that although driven at excessive rates of speed, the increase in inflation pressure amounted to only 4 pounds, which, of course, is negligible, because many times 4 pounds would not cause the tire to blow out.

It is very advisable for each motorist to have a pressure gauge of his own. It is also very convenient, and by having it the motorist can test his tires every few days. If this is done he will be in position to know when to pump them up again, and if he watches this closely, keeps the tires at the pressures recommended above, he is bound to receive gratifying results.—R. S. Wilson, manager service department, Goodyear Tire and Rubber Co.

Fisk

Chicopee Falls, Mass.—Editor Motor Age—One of the foremost reasons for the average present-day automobile tire living a longer

WEIGHT AND INFLATION OF PENNSYLVANIA TIRES

Below we give table showing required inflation and maximum weights with passengers and equipment.

	290	335	375*	415	460	500
3 -in. tire...Load, lbs.....	290	335	375*	415	460	500
.....Pressure, lbs.....	35	40	45	50	55	60
3½-in. tire...Load, lbs.....	410	460	515*	565	615	670
.....Pressure, lbs.....	40	45	50	55	60	65
4 -in. tire...Load, lbs.....	625	690	750*	815	875	940
.....Pressure, lbs.....	50	55	60	65	70	75
4½-in. tire...Load, lbs.....	825	900	975*	1050	1125	1200
.....Pressure, lbs.....	55	60	65	70	75	80
5 -in. tire...Load, lbs.....	1050	1135	1225*	1310	1400	1485
.....Pressure, lbs.....	60	65	70	75	80	85
5½-in. tire...Load, lbs.....	1300	1400	1500*	1600	1700	1800
.....Pressure, lbs.....	65	70	75	80	85	90

* Proper maximum load for average conditions.

in Pounds Per Square Inch for All Common Sizes of Pneumatic Tires

Over-size 37 x 4	38 x 4	40 x 4	42 x 4	Over-size 33 x 4 1/2	34 x 4 1/2	Over-size 35 x 4 1/2	36 x 4 1/2	Over-size 37 x 4 1/2	38 x 4 1/2	40 x 4 1/2	42 x 4 1/2	34 x 5	Over-size 35 x 5	36 x 5	Over-size 37 x 5	Over-size 38 x 5	Over-size 43 x 5	36 x 5 1/2	Over-size 37 x 5 1/2	38 x 5 1/2	Over-size 39 x 6	TIRE
					90	90	90	90				100	100	100	100				110	110		Ajax
				90	90	90	90	90				100	100	100	100	100			110	110	120	Braender
		80	80	90	90	90	90	90	90	90	90	100	100	100	100	100	100	110	110	110	120	Continental
					90	90	90	90	90			100	100	100	100	100						Dayton
950-900 70	1000-850 70	1050-900 70	950-800 80	1025-850 80	1125-900 80	1175-950 80	1225-1000 80	1250-1050 80	1300-1100 80	1375-1150 80	1450-1200 80	1200-1000 90	1250-1050 90	1300-1100 90	1350-1150 90	1450-1250 90	1650-1350 90	1375-1300 100	1575-1350 100	1600-1400 100	1750-1600 100	Empire
	850 75-80		700 85-90		900 85-90	1000 85-90		1050 85-90	1125 85-90	1200 85-90	1250 85-90	950 95-100	1000 95-100	1050 95-100	1100 95-100	1200 95-100			1150 105-110	1200 105-110		Federa
900-750 70	950-800 70	1000-850 70	1000-800 80	1050-850 80	1100-900 80	1150-950 80	1200-1000 80	1250-1050 80	1300-1100 80	1400-1200 80		1250-1000 90	1300-1050 90	1350-1100 90	1400-1150 90	1500-1250 90	1700-1450 90	1500-1250 95	1550-1300 95	1600-1350 95	1750-1600 100	Firestone
700-1000 65-80	700-1000 65-80	700-1000 65-80			900-1400 70-85	900-1400 70-85	900-1400 70-85							1200-1600 75-85								Fisk
																						Goodrich
																						Goodyear
1575	1650											2100		2200								Hood
	950-800 75		975-800 85	1050-850 85	1125-900 85	1150-950 85	1225-1000 85	1250-1050 85	1300-1100 85	1375-1125 85	1450-1250 85	1250-1000 90	1300-1050 90	1350-1100 90	1400-1150 90	1500-1250 90		1500-1275 100	1550-1300 100	1600-1350 100	1750-1600 100	Kelly-Springfield
	950-850 80		950-890 90	1025-850 90	1125-900 90	1150-950 90	1225-1000 90	1250-1050 90	1300-1100 90	1375-1150 90	1450-1200 90	1200-1000 100	1250-1050 100	1300-1100 100	1350-1150 100	1450-1250 100	1650-1450 100	1525-1300 110	1550-1350 110	1600-1400 110	1750-1600 110	Knight
	1000-850 80		950-750 90	1050-750 90	1125-900 90	1175-935 90	1225-975 90	1260-1010 90	1300-1050 90	1350-1100 90	1450-1200 90	1200-950 100	1250-1000 100	1300-1050 100	1350-1100 100			1350-1100 110	1400-1150 110	1450-1200 110		Lee
			950-750 80	1025-850 80	1125-900 80	1175-950 80	1200-1000 80	1250-1050 80					1250-1000 85	1300-1100 85	1350-1150 85				1575-1350 100	1600-1400 100		McGraw
																						Marathon
				1400-2600 70-80	1400-2600 70-80	1400-2600 70-80	1400-2600 70-80	1400-2600 70-80	1400-2600 70-80			2200-3200 80-85	2200-3200 80-85	2200-3300 80-85								Michelin
				90	90	90	90	90					100	100	100							Miller
					900 90	900 90	950 90					1000 100	1000 100	1100 100	1100 100							National Redwal
																						Carspring
				80-85	80-85	80-85	80-85	80-85	80-85	80-85		85-90	85-90	85-90	85-90	85-90			90-95	90-95		Pennsylvania
																						Quaker City
													100	100	100				110			Racine
																			110	110	110	Republic
																						Swinehart
1000-85			950-750		900-1125	1175-935	1225-975	1260-1010	1300-1050	1350-1100	1450-1200	1250-1000	1300-1050	1350-1100					1400-1150			Thermold
				90	90	90	90	90	90	90	90	100	100	100	100							U. S.
1000-850 80	1050-900 80		950-750 90	1000-800 90	1125-900 90	1175-935 90	1225-975 90	1260-1010 90	1300-1050 90	1350-1100 90	1450-1200 90	1200-950 100	1250-1000 100	1300-1050 100	1350-1100 100	1450-1200 100	1550-1400 100	1350-1100 110	1400-1150 110	1450-1200 110	2000-1800 120	Victor
			1000-800 80	1050-850 80	1100-900 80	1150-950 80	1200-1000 80	1250-1050 80				1250-1000 90	1300-1050 90	1350-1100 90	1400-1150 90			1500-1250 95	1550-1320 95	1600-1350 95		

per schedule even though a tire is inflated in the cool atmosphere of a garage and run over the hot oil roads in the warmest day of summer. A rise of a few pounds pressure due to running will not hurt any tire, but lessening the pressure brings it to an early death.

If tires are inflated as per inflation table you will find that they will be flexible and readily absorb the road irregularities and protect the occupants of the car as well as the engine and the delicate mechanism of the car from road jars and jolts.

Inflation is the answer for tire economy.—Fisk Rubber Co.

Kelly-Springfield

New York—Editor Motor Age—The standard pressure of from 18 to 20 pounds per each inch of cross section of the tire has been accepted by the leading tire manufacturers after careful investigation. This applies, of course, only to standard sizes of tires carrying their normal weights.

Such a pressure enables a tire, under its normal load, to retain its average contour within the limits of a certain small, allowable deflection at its point of contact with the road, which serves to absorb all of the jolts.

If the pressure in the tire is allowed to

fall below this recommended figure, we naturally find that this deflection, or flattening of the tire at its point of contact with the road, increases. The danger point will be reached long before the tire becomes absolutely flat, and is not determined by the pressure of the rim on the outer surface. This flattening of the tire at its point of contact causes an undue bending of its structure, which follows the side walls as the wheel turns throughout the entire circumference of the casing. It is a rolling—

bending motion which is continuous as long as the wheel moves. Why should we expect rubber and fabric of which the tire is composed to withstand a punishment, which, through the continual bending back and forth would eventually destroy the toughest fiber?

But, in addition to this motion, this wave or bending which remains constantly at the point of contact of the deflated tire on the road induces a separate motion between the

(Continued on page 46)

LOAD AND INFLATION SCHEDULE FOR REPUBLIC PNEUMATIC TIRES

INFLATION PRESSURE	WEIGHTS PER WHEEL THAT MAY BE CARRIED UNDER EACH TIRE SECTION DIAMETER, INCHES					
	3	3 1/2	4	4 1/2	5	5 1/2
30	240					
35	280	350				
40	325	400	485			
45	365	450	545	660		
50	405	505	610	735	860	985
55	450	555	675	810	945	1085
60	490	605	735	885	1035	1185
65		660	800	960	1120	1285
70		710	860	1035	1210	1385
75			925	1110	1295	1485
80			985	1185	1385	1585
85				1260	1470	1685
90					1555	1785
95					1645	1885
100						1985

The Readers' Clearing House

Using Kerosene to Remove Carbon

L ELAND, Ill.—In the January 20 issue of Motor Age in the Reader's Clearing House department under the heading "Kerosene as a Carbon Remover," Motor Age states that the best procedure is to pour some kerosene through the priming cups when the motor is warm, let the motor stand over night with the oil inside and in the morning blow it out along with the dislodged carbon. Now I might remark that I have made my living for the last 6 years repairing motor cars and have experimented some with kerosene. An owner will peruse these lines thoughtfully three or four times, then remembering the old wagon hasn't been ticking just right for some time, will get the kerosene can out and warm up the engine, then try to pour some in the petcocks. Finding it an almost impossible task, he will take out the plugs, dump in some kerosene out of the can, put the plugs back in and then go to the house and that night dream of better days.

In the morning he goes to the garage and starts the engine and then makes a noise like de Palma warming up the Mercedes and in his imagination sees the carbon coming out in big chunks. Maybe it does, but that is not the point. When he poured in the kerosene, did it stay in the combustion chamber and dissolve the carbon? It did not. If there was enough carbon to amount to anything or enough to interfere with the running of the motor, the rings would be loose enough to allow the kerosene to work past and down into the lubricating oil in a very few minutes, and when he was making the de Palma-Mercedes noise the next day it was with a kerosene-diluted cylinder oil, and as Motor Age recommends periodical applications over night in old engines to be especially beneficial at intervals of about 1 week, his car would be constantly working on that diluted cylinder oil and in a couple of months would need reboring besides having all the bearings and most of the nuts on the car loose.

I have had two cars in for engine repairs the last year for just this cause, periodic kerosening over night. Both were in really bad condition, and as far as I was able to learn there was no other cause.

Maybe kerosene will remove carbon if used this way. I am not prepared to prove that it does not, but I have used this treatment on motors that needed to be torn down for other reasons and then immediately took them apart and I never could tell that it had any effect other than softening the carbon. I never saw where it had detached pieces of the carbon so that it could be blown out, but this is what it does do: It softens the carbon and to soften the carbon on the valves and seats, especially on the exhaust valves, means that they will pound it out of the way and have a better seat. In this way it will improve the running of the motor sometimes to a marked degree.

Motor Age states that it is sometimes advantageous to pour a little in the carbureter while the engine is running. Here its benefits are more noticeable. I find though it takes a couple of quarts to do much good. I open the throttle and advance the spark and pour it in with a funnel until it almost chokes the engine down. Then stop pouring until it recovers and gets up speed and then give it some more. In this way it reaches the valve seats and stems, particularly the latter, and the carbon on the seats and stems will be softened and worked off these surfaces and will make a remarkable difference in the operation of the car if it is suffering from carbon.

Now there are a great many Motor Age subscribers who are in this owner-driver class and who take every article in your paper so seriously that they would just as soon accept an oath sworn on Motor Age as on the Bible. To this class of readers that particular article will do an inestimable damage, for without question there will be many who will follow your suggested treatment to the letter and Motor Age states: "Pour some in," and the inevitable result will be costly repair bills and the carbon will be there just the same. Knowing as I do the faith that many of your readers have in the soundness of the suggestions which you publish frequently in your paper, I respectfully suggest that you exercise a more rigid censorship over articles such as this and there will be fewer cars in this country come to grief through the very means taken to preserve them, and there are a great number in this class.—J. C. Augustine.

Motor Age heartily concurs in the statements made by Mr. Augustine, and realizes

Reader Takes Exception to Treatment—Not Meant as a Cure-All

that the kerosene information might be misleading to the uninitiated. However, it was never meant to infer that a large amount should be used. By giving directions to put a quantity into the cylinders we perhaps should have specified the amount. We did not mean to use more than a tablespoon per cylinder, and that amount would not be of appreciable detriment to the lubricating oil.

It is true that kerosene will get down into the crankcase if allowed to stand over night, but that applies especially to injecting large amounts in the cylinders. Common sense would almost tell a man not to fill the combustion chambers full of the liquid, although Motor Age admits that for the benefit of the tyro the information should have been more specific.

It has been found that by injecting about 1 tablespoonful of kerosene in each cylinder when the engine is hot, and then allowing it to stand in the cylinders, the kerosene has a strong solvent action, but even this mild application may be overdone if the practice is followed at too frequent intervals.

Kerosene is, of course, harmful to the lubricating properties of the oil and tends to cut out the bearings, if used in sufficient amount.

Motor Age hopes that it has not created any wrong impressions on this point and thanks its correspondent for aiding in preventing a stampede to the use of kerosene. In this case, as in most others, it is largely a question of common sense and judgment. You cannot expect kerosene to be a panacea for all motor ills. If we have given that impression we are sorry. Kerosene is good as a mild tonic, so to speak, but it will not do much good for the cripple. To expect it to benefit any old engine is like trying to cure a case of nervous breakdown with witch hazel.

ADJUSTING MAXWELL CARBURETER Reader Finds Difficulty in Getting Best Setting for Good Results

Beatrice, Neb.—Editor Motor Age—When setting the float in the K-D carbureter for the model 25 1916 Maxwell, should gasoline show in the atomizer or cup on the end of the spray nozzle? What is the proper setting?

2—Is the purpose of the ball valve to raise at high speeds and is it not possible for it actually to choke the venturi opening when raising to top of cage? It seems that after throttle is half open, further opening does not give increased power.

3—Is there a temperature at which a carbureter, such as the K-D, works best? Is it pos-

sible for too much hot air to be admitted for its best action?

4—As the pistons on this model become smooth from wear, oil seeps up into the head and gums inside the plugs, although I use the Maxwell oil advised. Can Motor Age suggest a remedy?—Scammon Optical Co.

1—In the K-D carbureters used on 1916 Maxwell 25, the setting of the float should be $\frac{1}{4}$ inch from the top of bowl to top of float when chamber is full of gasoline. At this setting a slight amount of gasoline will show in the spray nozzle, or atomizer.

2—Yes. The ball valve raises at increased speeds. Owing to the inner construction of the chamber center it is impossible for the valve to choke the venturi at any point. In regard to the throttle opening, be sure that the flow of gasoline is not obstructed at any point, also that wires around ball valve are not riding ball. With these points in good condition, look for trouble other than with the carbureter.

3—The varying grades of gasoline now being marketed makes it impossible for us to say at just what temperature the carbureter should do its best work. In winter and in the northern and central states we have not found it possible to get too much warm air with the shutter in warm-air pipe closed. In warm weather and in warm climates, shutter in pipe should be opened.

4—As there could be several reasons for the oil going by the piston, we would suggest that you take your car to one of the several Maxwell service stations for their advice or that you take the trouble up with the Maxwell Motor Sales Corp., Service Department, Detroit, Mich.

DISCO STARTER ON 1913 LOCOMOBILE Four-Cylinder Engine Had a Maximum R.P.M. of 1,800

Anahelm, Cal.—Editor Motor Age—What was the bore and stroke of the 1913 four-cylinder Locomobile?

2—What make of starter and generator was fitted?

3—Did it have four speed transmission with direct drive on fourth?

4—What size tires were fitted and what was the car weight?

5—What was the maximum engine speed and the gear ratio on direct drive?

6—What was the factory price on the five-passenger touring car?

7—In the March 9 issue Motor Age states aluminum rods and pistons will weigh from 25 to 50 per cent of the iron ones, in answering W. H. Barnhart's question. Pardon me, but are aluminum rods considered safe practice?—R. E. Huff.

1— $4\frac{1}{2}$ by $4\frac{1}{2}$ inches.

2—A Disco gas starter was used on this model and there was no necessity for a generator, ignition being furnished by a magneto and storage battery. An electric system was furnished, but not as stock equipment.

3—Yes.

- 4—34 by 4½ inches; weight, 3,430 lbs.
5—1,800 r.p.m.; 3.54 to 1.
6—\$3,600.

7—No. This statement referred specifically to the pistons and not to the rods too. Chrome nickel-steel rods would give lighter weight than iron ones and be as safe.

READER ADVANCES HIS THEORIES Points Well Taken in One Case—Difference of Opinion on Other

Sheffield, Ill.—Editor Motor Age—In your Clearing House columns you advise the bolting of plates on top of piston for increasing pressure on in the Ford car. You recommend cutting material from cylinder head. Now, in some steam engines I have run there was no adjustment of piston rods or connecting rods and we had to keep clearance in cylinder correct by shims on either side of crank pins. Why would it not be better when increasing pressure in a gas engine to replace the upper half of connecting rod bearing with one thick enough to increase pressure to where desired? It seems that this would be more satisfactory and would be less work. The lower half could be used as it was and enough extra shims used to make up the difference in thickness of upper bearing. Then if for any reason a person wanted to reduce to original pressure, they could replace old bearing.

You state in reply to James F. Hill that aluminum pistons would probably increase his power. Is it not a fact that aluminum pistons properly fitted will increase the power of a motor fitted with the old style cast iron piston from 10 per cent to 15 per cent? I have a 1911 Moline with 4 by 6 motor that I expect to have fitted with aluminum pistons. I expect an increase of power at all speeds and quite an increase at high speed. I figure that if I reduce each piston from 2 to 3 pounds that I should have an increase of power equal to what it would take to start and stop these 2 or 3 pounds twice in every revolution at 900 r. p. m., average motor speed of this motor. It would be equal to starting that 2 or 3 pounds difference 7,200 times every minute.—E. R. Allen.

1—The suggested method is plausible and feasible.

2—It depends largely on what the condition of the motor was before changing as to what the percentage of gain in efficiency would be when new pistons of iron are put in. If your old pistons are worn, then the installation of new ones, no matter what the material, would improve it, if properly fitted. The aluminum piston gives added efficiency to what the cast-iron piston shows at its best.

Gas Intake on Suction Stroke

Edina, Mo.—Editor Motor Age—How much fresh gas is drawn or admitted into the cylinder on the suction cycle as compared to the piston displacement in a four-cycle motor, as in the Ford?

2—With 200 pounds of pressure at the beginning of the working cycle, what would be the pressure at the close of the cycle with the exhaust yet closed on an ordinary L-head motor?—T. H. Lay.

1—This depends upon many factors, such as size and shape of intake manifold, size, lift and timing of the valves, etc. In general, it may be assumed to be between 75 and 90 per cent.

2—Your question is not understood. The pressure at the instant of explosion is between three and three and one-half times the compression pressure.

THE MOTOR MISSES IN BUICK 31 Suggested That Piston Ring Joints Be Examined Thoroughly

Brownwood, Tex.—Editor Motor Age—I have a model 31 Buick which has been missing on No. 2 cylinder for a considerable length of time. The spark plug would become soaked with oil, so I put in three genuine, non-leakable piston rings. This kept the plug clean, but still it had the same miss. We closely

examined the intake manifold for leaks, but found none. We also put in new valves and valve cages. We used several different kinds of standard spark plugs. We have a good spark to and through the plugs. We also changed the magneto one-half round, then changed the wires comparatively and this did no good. The motor will hit on all four cylinders at about 20 miles per hour, the motor has excellent compression. I hope Motor Age can tell me some way to remedy this trouble.—Ellis Gotcher.

Possibly the piston ring joints are all in line, so that gas can leak past them. Or the valves might not have enough clearance, resulting in a slight holding open when they should be entirely closed. It might be that the ignition is not timed correctly; possibly it is not advanced enough. These are merely suggestions, for it would be impossible to say definitely where to look for the trouble without knowing more specifically what the symptoms are.

SOME DATA ON HIGH-SPEED MOTORS Use of Half Gasoline and Half Kerosene Difficult—Hard to Vaporize

Ardmore, Okla.—Editor Motor Age—What is the r.p.m. of the Maxwell 25, 1916 model?

2—What is meant by the term, "a high-speed engine"?

3—Is the Maxwell a moderately high-speed engine?

4—What would be the objection to using a fuel consisting of half gasoline and half kerosene in a motor car?

5—How many miles will the following cars average on a gallon of gas: Packard 12, Cadillac 8, Overland, Haynes, Maxwell?

6—Why did the Maxwell company abandon the half-elliptic spring on the rear axle of the 1913 car for the three-quarter elliptic spring which is now used?

7—How fast will a Packard 12 travel?

8—Have any cars ever been made with more than twelve cylinders?—J. W. Ratley.

1—2,200 r. p. m., speed of maximum horsepower.

2—Just what the words convey. It is an engine that operates at higher speeds, comparatively, than the motors that used to be fitted to cars. That is, when the car is running at, say, 20 miles per hour, the high-speed engine is revolving faster than an engine of more moderate speed range would be running for the same car speed. Fifteen hundred to 1,800 r. p. m. used to be about the maximum speed of motors before the coming of the so-called high-speed engines, whose maxima often run well over 3,000 r. p. m.

3—Yes.

4—The average carbureter will not handle it properly, as such a mixture is of too low a gravity. Carbonization, due to improper vaporization of such a fuel, would be one of the results. It is increasingly

difficult properly to vaporize a fuel, the heavier that fuel is.

5—We have no records of these figures.

6—Probably because of better spring action with the three-quarter elliptic, better riding, although it is hard to assign reasons for changes without sharing the confidence of the engineer who makes them.

7—It has gone 72.7 miles per hour for 10 miles on the Chicago speedway in touring car form with windshield up and top down.

8—No stock cars, at least. No single motor of more than twelve cylinders has been put in a motor car.

PECULIAR KNOCK IN CHALMERS May Be a Broken Piston Ring or a Loose Bearing

Towanda, Kan.—Editor Motor Age—I have a Chalmers 6-48, model 26. It has given me good satisfaction until the last 500 miles. When the machine is running about 35 miles per hour or more, there is a very peculiar noise which I think, as near as I can locate, is in or around the engine, although I can put my hand on any part of the engine or frame and cannot feel any vibration. I have inspected every nut and bolt, and they are all in perfect condition. What would Motor Age think might be the cause and how may this be remedied?—W. Chain Robison.

1—Possibly one of the bearings is loose, causing a bearing knock. This is about the best suggestion we can give without more specific details. It might be that a ring is broken on one of the pistons, or that your spark is not advanced enough when going at speed.

RECHARGING THE FORD MAGNETO Data Given on How Magnets Should Be Handled for Best Results

Sheridan, Ill.—Editor Motor Age—What is the cause of a knock in front of the Ford Motor? The bearings all seem to be tight and can find no reason why it should knock.

2—Can a Ford magneto be recharged without taking the magneto apart. If so, will you kindly state how, and can this be done with dry cells?—A. Reader.

1—Possibly the front piston has a broken ring, or is loose in the cylinder. There are so many things that might cause such a knock that it is difficult to do more than suggest a cause with such meager information.

2—The magnets of a Ford magneto can be charged without removal from the car, although the Ford company states that from its experience, recharging of this kind is not satisfactory when attempted by ordinary garage or repair men. The Ford concern does not recommend it, and believe that in the case of weak magnets far better results follow when those parts

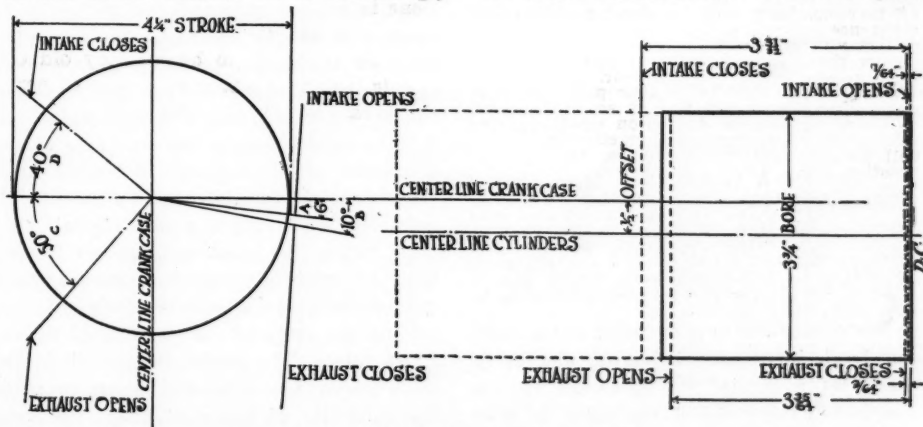


Fig. 1—Valve timing of a 1913 Regal

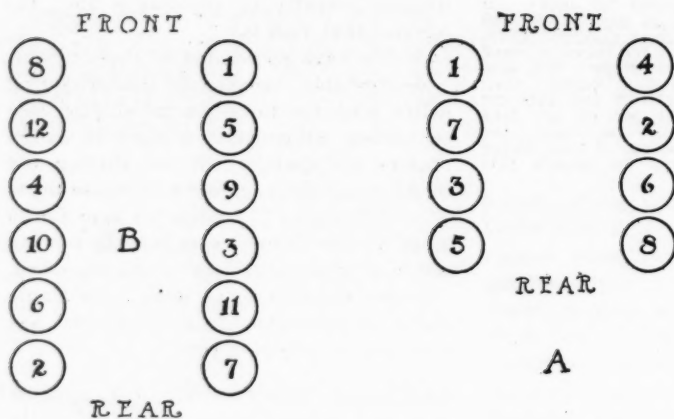


Fig. 2—Diagrams to indicate the firing order of the Cadillac eight at A and the Packard twin-six at B

are replaced with new magnets of proper strength.

However, for the benefit of those who wish to attempt the work, Motor Age is able to give the instructions. Fig. 3 shows the method and connection, using five or six, 6-volt, 40-ampere storage batteries connected in series. If direct current from another source is used, enough resistance should be connected in to reduce the current at the magneto to approximately 30 volts, 30 amperes.

The first step necessary is to get the magneto in proper position to receive the current. To do this, hold a compass over the transmission cover, as shown in the diagram, and turn the motor over slowly until the hand of the compass, which normally points North, will point to a spot about $\frac{1}{4}$ inch from the side of the fibre at the bottom of the contact assembly on the transmission cover. Next, disconnect the wire leading to the dash coil from the contact assembly and attach instead the wire leading from the positive pole of the battery (or other source of current). You are now in a position to use the current.

To do this, make and break the current by striking the wire leading from the negative pole of the battery against some metal part of the motor. About twenty contacts each of about 6 seconds' duration, should be sufficient to fully recharge the magnets. When doing the work, be sure that you do not connect the negative pole of the battery with the contact, and also make sure that the compass indicates that the magnets are in the position described above. Otherwise, they will be weakened instead of remagnetized.

PRINCIPLE OF THE GNOME MOTOR How It Operates and General Character Given in Detail

College Point, L. I.—Editor Motor Age—I would like to know where I could get a book or information dealing in the construction and operation, also the principles involved in a revolving cylinder motor especially pertaining to one certain make, the Gnome. I am very much interested in this motor and would like to have all the information possible concerning its operation, etc.—Reader.

The exhaust valve is mounted in the cylinder head, its seating being screwed in by means of a special box spanner. On the fourteen-cylinder model the valve is operated directly by an overhead rocker arm

with a gunmetal rocker at its extremity coming in contact with the extremity of the valve stem. As in standard motor car practice, the valve is opened under the lift of the vertical push rod, actuated by the cam. The distinctive feature is the use of a four-blade leaf spring with a forked end encircling the valve stems and pressing against a collar on its extremity. On the seven-cylinder model the movement is reversed, the valve being opened on the downward pull of the push rod, this lifting the outer extremity of the main rocker arm, which tips a secondary and smaller rocker in direct contact with the extremity of the valve stem. The springs are the same in each case.

The intake valves are automatic, and are mounted in the head of the piston. The valve seating is in halves, the lower portion being made to receive the wrist pin and connecting rod, and the upper portion, carrying the valve, being screwed into it. The spring is composed of four flat blades, with the hollowed stem of the automatic valve passing through their center and their two extremities attached to small levers calculated to give balance against centrifugal force. The springs are naturally within the piston, and are lubricated by splash from the crankchamber. They are a delicate construction, for it is necessary that they shall be accurately balanced so as to have no tendency to fly open under the action of centrifugal force. The intake valve is withdrawn by the use of special tools through the cylinder head, the exhaust valve being first dismounted.

Coming to the manner in which the exhaust valves are operated, this at first sight appears to be one of the most complicated parts of the motor, probably because it is one in which standard practice is most widely departed from. Within the cylindrical casing bolted to the rear face of the crankcase are seven thin flat-faced steel rings forming female cams. Across a diameter of each ring is a pair of projecting rods fitting in brass guides and having their extremities terminating in a knuckle eye receiving the adjustable push rods operating the overhead rocker arms of the exhaust valve. The guides are not all in the same plane, the difference being equal to the thickness of the steel rings, the total thickness being practically 2 inches. With-

in the female cam is a group of seven male cams of the same total thickness as the former and rotating within them. As the boss of the male cam comes in contact with the flattened portion of the ring forming the female cam, the arm is pushed outward and the exhaust valve opened through the medium of the push rod and overhead rocker.

The number of cams is the same for the fourteen as for the seven-cylinder motor; on the latter, however, there is but one flattened portion in the female cam ring and only one of the projecting arms terminates in a knuckle to receive the adjustable push rod, the opposite arm being merely a guide. The flattened portion is at the guide side; thus, when the male cam comes in contact with it the arm is caused to descend in its guide and a pull exerted on what has come to be known as the push rod. For the fourteen-cylinder motor the action is direct, for there are two flattened portions on the female cam ring, one at the base of each projecting arm, and they are lifted in exactly the same manner as the tappets of a standard type of motor. The group of male cams is driven primarily by a pinion on the crankshaft in mesh with two intermediate pinions, transferring their motion to the male cam pinion gear turning free on the extremity of the crankshaft.

Crank Shaft Fixed and Hollow

The crankshaft of the Gnome is fixed and hollow. Advantage is taken of this to supply fuel and lubricant to the motor.

The lubricant, consisting of pure castor oil, is fed to the two pumps by gravity and delivered from them through the sight feeds carried in any suitable position to tubes mounted within the hollow shaft. The oil is thus taken direct to the main bearings, to the crankpins and to the connecting rod ends. The oil driven through the bearings into the crankchamber suffices for lubricating the cylinder walls, but a large amount is taken into the combustion chambers with the mixture and driven out with the exhaust. It is this feature which makes the Gnome a considerable consumer of lubricant, and makers' estimate being 7 pints an hour for the 100-horsepower motor; but in practice this is largely exceeded. The gasoline consumption is given as 300 to 350 grammes per horsepower.

There is no carbureter in the usual acceptance of that term, the substitute consisting of a brass elbow mounted on the hollow end of the fixed crankshaft. Within the elbow is an ordinary type of butterfly-throttle, and around its vertical portion an ordinary air sleeve, generally employed only for starting. Gasoline is brought to this carbureter—which is really not designed to carbureter—by means of a copper tube with a slightly restricted outlet. There is neither float chamber nor jet. In many of the tests made at the factory the fourteen-cylinder motor was operated with the extremity of the gasoline pipe pushed into the hollow crankshaft, speed being regu-

lated entirely by increasing or decreasing the flow through the tap in the base of the tank.

Even under these conditions the motor has been throttled down so as to run at 350 r.p.m. without mis-firing. Its normal speed is 1,000 to 1,200 revolutions a minute. From the crankchamber the mixture passes into the cylinders and then through the automatic intake valve which is mounted in the head of each piston.

THE TIMING OF A 1910 FRANKLIN Proper Setting Explained in Detail for This Model

Peoria, Ill.—Editor Motor Age—Kindly explain the timing of the magneto on the model D 1910 Franklin.—Carroll Hanelson.

To set the camshaft, having walking beams adjusted loosely, and put cam gear on shaft just tight enough so that it will turn shaft, and at the same time permit the shaft being turned in its hub. Now revolve the shaft independently until No. 6, in case four-cylinder, No. 4, intake cam just starts to raise the valve lifter. Next, slip on the flywheel without meshing the gears and revolve till position "1 suction opens 6" coincides with reference mark on rear cylinder. With camshaft and crankshaft in this relative position, push on flywheel securely and set No. 6 suction valve walking beam adjusting screw and valve stem. Turn wheel normal direction of rotation till suction valve is just closed. The mark "1 suction closes 6" should coincide with reference mark. If the closing does not fall within the limits shown on chart, by altering the position of camgear one tooth either way, at the same time readjusting the walking beams, the correct adjustment may be secured. Where one tooth proves to be too much, the proper position of cam can be had by turning shaft in cam gear hub in whatever direction necessary, or by slightly altering the walking beam adjustment. Now check up the timing on all other valves, taking care that opening and closing occur within specified limits. Tighten gear securely on camshaft, remove flywheel and then mark location of keyway in camshaft gear. Cut keyway, reassemble gears and again check timing.

Where camshaft gear keyway has already been cut, the correct timing of one

valve will insure correct timing of others, provided cams are tight on shaft.

To set magneto, place flywheel in position where mark on flywheel denoting spark break coincides with center line reference mark. Have magneto gear fixed on driving shaft so as to permit movement of driver in gear taper. After determining which cylinder is in firing position, place distributor brush on the proper segment. Then move magneto driver to such a position that a piece of cigarette paper placed between the breaker points can be withdrawn by just a perceptible pull. Now tighten gear, move flywheel a short distance in reverse direction and then forward until break occurs. Notice whether indicating marks coincide. In checking timing, always try break when revolving flywheel in normal direction of rotation. There will then be no chance for error due to backlash or lost motion in driver. Locate and cut keyway and again check timing after putting on gear.

Be sure timing is right before putting in clutch.

Too much importance cannot be attached to the necessity of timing the valves of a Franklin motor while it is hot. Because of its normally high running temperature the different parts of the motor expand or elongate when the motor is in operation. Since the parts are not all made of the same material and do not attain the same temperature, they do not expand or elongate equally. Therefore, if the valves of a motor are properly timed when it is cold they will not be properly timed when it is hot. The motor can not be said to be hot when it has merely been run while the car is standing idle. The proper thing to do is to give the car a hard run of not less than 10 miles, and then time the motor.

In order to get the maximum power from the motor the closing of the exhaust and of the suction valves should occur at the proper points in the line of piston travel and at the proper time.

The flywheel on the four-cylinder models is marked "Center line 1-4 and 2-3" and in the six-cylinder models it is marked "Center line 1-6, 2-5 and 3-4." This means that the pistons in the cylinders of these numbers are at the top of the stroke when the corresponding numbers are at the top of the flywheel. Therefore, 1¼ inch past center would mean that the pistons whose numbers were stamped on the "Center line" had started on their downward stroke and moved below the upper dead center position an amount corresponding to 1¼ inch of the flywheel circumference.

A reasonable variation is allowable in the opening points of the exhaust and inlet valves; nevertheless, these points should be checked in order to determine whether or not the variation is at all excessive.

If, when adjusting the walking beams, the clearance between the former and the

valves is kept down to 1-64th of an inch, when the motor is hot, the results obtained from the motor, both as to power and quietness, will be much more satisfactory.

OPENING AND CLOSING OF VALVES Intake Sometimes Opens Before Exhaust Is Fully Closed—Reasons Therefor

LuVerne, Ia.—Editor Motor Age—I am overhauling a model 79 Overland and find that the intake valve opens before the exhaust is closed. What is the reason for this? Would it not allow the exhaust gases to back up into the carburetor? Or, if not that, would it not impair the suction of the intake charge?

2—Have been reading in previous issues about the danger of running generators without the battery in the car. Would raising the brushes be just as good as disconnecting the generator drive?—Leo Notestine.

1—The point is often brought up as to why the exhaust valves are left open after the inlet has been opened, and also why the exhaust is opened before the end of the power stroke, thus allowing some of the explosive pressure to escape through the valve opening. Examination of the conditions of operation soon dispels any thought that the exhaust should remain closed until the very end of the explosion stroke, at least.

As a matter of fact, the practice is almost universal of leaving the inlet valve open until the piston has not only reached the bottom of its suction stroke, but has actually started back on its compression stroke, ordinarily about ½ inch up. At first thought it would seem that some of the gas drawn in would be forced back again into the inlet passage, but the speed of the engine must be taken into consideration. At a normal rate of running, about fifteen cycles would be completed in 1 minute with a moderate-speed engine, and at such a speed the piston has reached the lowest point of its stroke before the gas has all been able to get in, because the gas moves slower. So even when the compression stroke has begun, there is still some slight suction tending to draw more fuel in.

2—Yes, but it is not advisable, as you might get the brushes out of order.

Timing an Empire

Herrin, Ill.—Editor Motor Age—Kindly give the valve timing of the motor used in the 1913 Empire?—C. H. Mathis.

1—This is shown in diagram in Fig. 1.

Firing Orders of Eight and Twelve

Richmond, Ind.—Editor Motor Age—Kindly give me the firing order of an eight and twelve-cylinder motor.—W. Personett.

1—Firing orders of the Packard Twin-Six and Cadillac eight are given in Fig. 2.

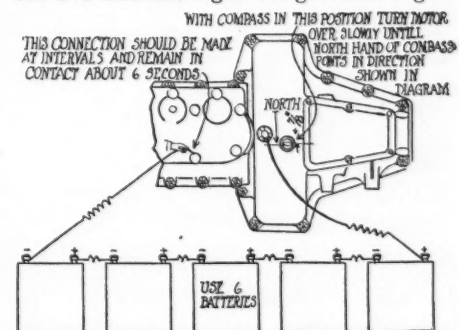


Fig. 3—Recharging Ford magnets

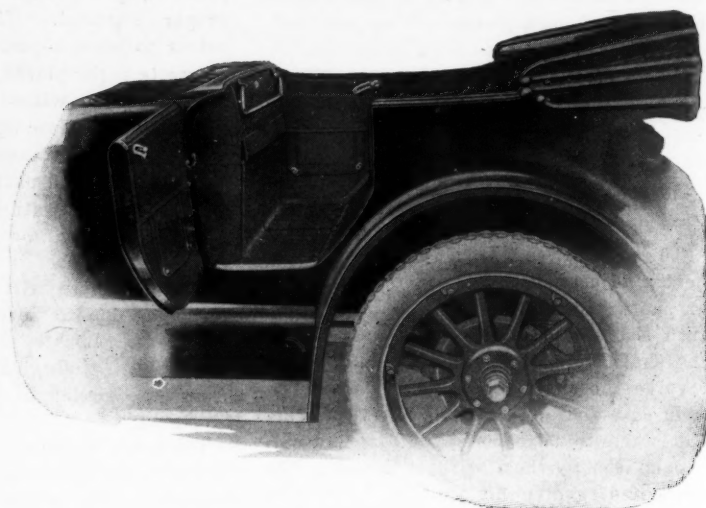
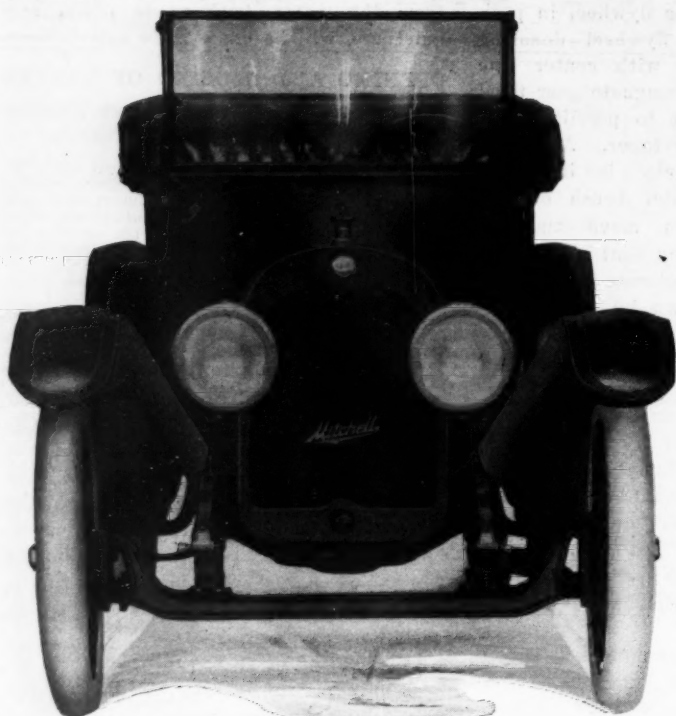
Communications Received and Inquiries Answered

J. C. Augustine.....Leland, Ill.
Scammon Optical Co.....Beatrice, Neb.
R. E. Huff.....Anaheim, Cal.
E. R. Allen.....Sheffield, Ill.
T. H. Loy.....Edena, Mo.
Ellis Golcher.....Brownwood, Tex.
J. W. Ratley.....Ardmore, Okla.
W. C. Robison.....Towanda, Kan.
Reader.....College Point, L. I.
Carroll Hanelson.....Peoria, Ill.
Leo Notestine.....Luverne, Ill.
C. H. Mathis.....Herrin, Ill.
W. Personett.....Richmond, Ind.

No inquiry not signed with the inquirer's full name and address will be answered in this department.

New Mitchell Models Show Very Much Improved Bodies

Double Cowl Effect, New Hood Lines, and High Narrow Radiator Are Features
Car Is Larger and Roomier



Body refinements in the new Mitchell, showing at the left the high, narrow radiator with headlamps attached to the shell, and the strong, smooth sweep back to the rear of the body. At the right is illustrated the tonneau interior with the spare seats folded down. This illustrates the wide door and the tonneau light in the back of the cowed front seats

FIRST of the new models of the Mitchell six have made their appearance as larger, roomier, and considerably more beautiful cars than the previous issue known as the Six of '16. Mechanically, changes are confined to minor refinements and such increases in strength and size of parts as made necessary by the 2 inches increase in wheelbase.

Exteriorly the new Mitchells are exponents of the latest in body design, having a high, narrow radiator, smooth sloping hood, which is well rounded at the top, the rear of the body having suggestions of boat lines together with a defined cowl at the back of the front seats. Together with the improvement in appearance and increase in size of the car, there has been an increase in price of \$75, making the five and three-passenger \$1,325 and the seven-passenger \$35 additional.

The eight is continued without any changes except that it is now furnished with the same type of body as on the new model six. The price on the eight-cylinder is the same—\$1,450 for either three, five or seven-passenger.

The new body has the popular double cowl, the hood lines melt gracefully into the front cowl, giving this cowl the appearance of being part of the hood itself. The front cowl swings along the driver's compartment in an unbroken line to the second or center cowl, to complete the full streamline effect. At the same time this second or center cowl forms the top of

a very neat compartment at the rear of the front seat, into which the extra seats fold. When these seats are in use this compartment has the advantage of giving an additional 4 inches of leg room for the occupants of these two extra seats.

Seven or Five-Seater

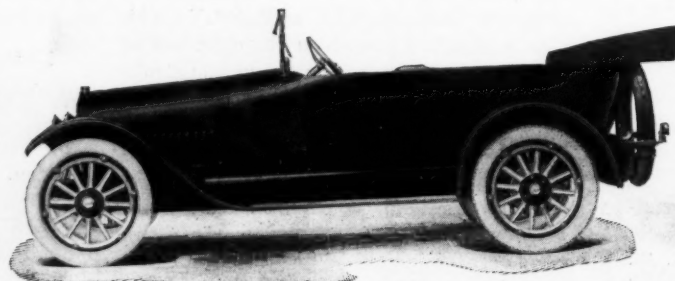
A feature that will be appreciated in time is that, like some other cars of its class, the five-passenger touring car in every respect is a duplicate of the seven except for the addition of the two spare seats; so that should the purchaser wish to increase the capacity of the five-passenger car he can obtain a seven-passenger in every respect like factory production by the installation of the additional seats which may be obtained later for \$35. These seats, by the way, are the dis-

Two little items which indicate the extent to which comfort has been considered are the glove compartment in the instrument board, and the tonneau light on the back of the forward seat. Within the instrument board there is fitted a new compartment in which small traveling requisites may be carried and which is locked by the same key that operates the ignition lock. The tonneau light is provided with push switch which can be operated by the tonneau passenger. Instead of the old style metal robe rail is a leather strap that matches the upholstery.

A feature of Mitchell construction to be found in the new six model is the mounting of the head lights rigidly to the removable black enameled radiator shell and the reversible feature of these lamps which allows them to be turned back on a hinge so that on dark nights on country roads the head lights may be called to play to provide light for backing up as well as for lighting the engine when adjustments are necessary or for making tire changes when out on the road at night.

Mechanically, the alterations have been made in the way of slight changes in the motor which work for increase in ac-

cessibility. This feature of accessibility is one that characterized the Six of '16 and Mitchell engineers have progressed still further in the new model. To this end, the single-unit starting system which was a part of the design in the earlier six has given way to the Westinghouse two-



New Mitchell touring car from the side, illustrating the rounded hood, smooth lines to the front seat and the double cowl effect

appearing type and fold completely out of sight.

The forward seats, while having no space between them, are divided by a small arm which forms a shoulder rest for both occupants but does not interfere with entrance or exit to the driver's seat.

unit system in which the generator and distributor are driven off the same shaft on one side of the engine while the starting motor operates through a Bendix drive to teeth cut on the flywheel. This eliminates the silent chain which was a part of the starter-generator drive in the previous motor.

The engine-driven tire pump has been elevated to a point where it can be gotten at easily and now is mounted immediately behind the fan and driven by a gear on the fan shaft.

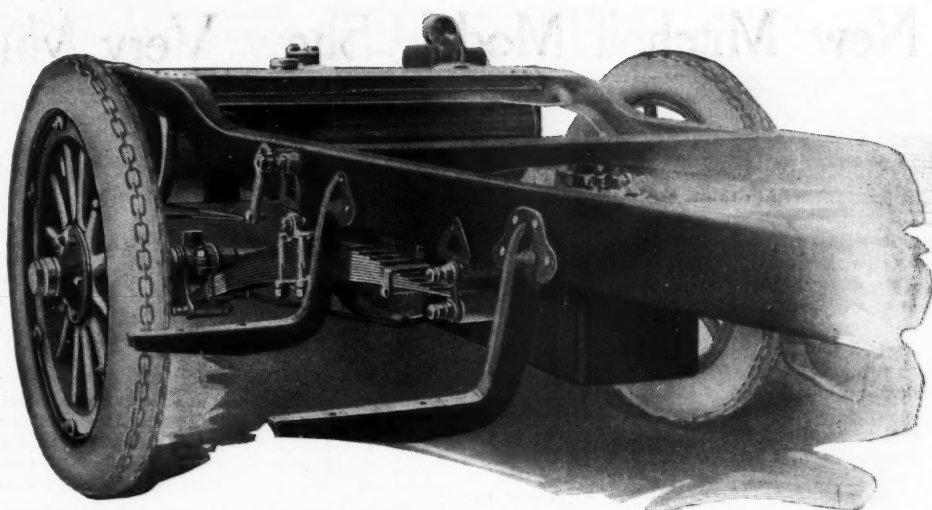
In the design of the block $3\frac{1}{2}$ by 5 motor there has been but little alteration. The chief one is the extension of the water jackets down to the crankcase, giving the engine a more symmetrical appearance as well as providing cooling surface or water surface for more excessive demands than previously.

The 2 inches increase in the wheelbase brings this figure up to 127 inches. This has been made possible by lengthening the cantilever springs 2 inches so that they now are 52 inches in length. Last year these cantilever were underslung and have been one of the factors in making the Six of '16 an unusually easy riding vehicle. Along with the increase in the length of the springs, the number of leaves has been increased naturally.

Details of Engine

The Mitchell motor is designed to be of the high-speed type and with this end in view special pains have been taken in balancing and lightening the reciprocating parts. The pistons are drilled to decrease weight, and also are provided with piston rings in the two lower grooves, which are made up of four special steel rings, to eliminate loss of compression. The top ring is of the ordinary iron construction. Small holes drilled through the machined oil grooves around the pistons allow the surplus oil to flow back into the crankcase.

The cylinders are of the L-head type, cast in block, integral with the crankcase. This is designed to give rigidity to the



Mitchell underslung cantilever rear suspension, showing method of attachment of the spring

motor and reduce vibration. The cylinder head is a one-piece casting, held in place by means of three rows of bolts and a leakproof fit is assured by the use of a one-piece, copper-asbestos gasket. The cylinder heads can be removed without disturbing any other part of the engine. The crankcase is of the barrel type, the lower half being formed by a light, seamless, steel stamping, which is divided into two compartments, the upper fitted with overflow openings, and troughed for the connecting rod spoons. The lower compartment comprises the oil reservoir.

The lubrication is combination of circulating and splash, the circulation being maintained by a plunger pump operated by an eccentric on the camshaft. Oil is pumped from the reservoir in the crankcase to the compartments under each connecting rod, and also to the timing gears in the front. A small quantity of oil is carried to the clutch bearing as well.

Ignition is taken care of by a storage battery and an automatic circuit breaker and distributor of the single-unit type, which is driven through a worm gear from the timing gears of the motor. The high-tension wires to the plugs are carried over

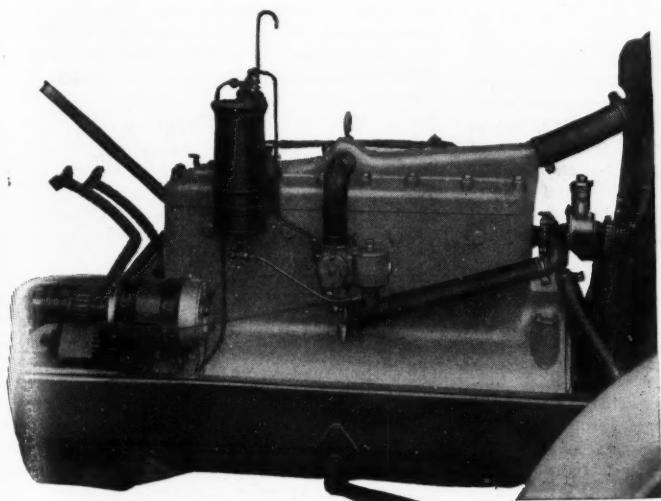
the engine with special supporting bracket, which prevents chafing and leaking of the current.

The carburetor is a Rayfield mounted on the right side of the motor. The intake manifold is cast inside of the cylinders, and passes between the middle cylinders from the carburetor on one side to the valves on the other. Fuel is supplied from a tank at the rear by the Stewart vacuum system. Within the flywheel is a cone clutch, which is made up of a stamped steel spider faced with chrome leather, and having auxiliary springs. Adjustment is provided by three adjusting units.

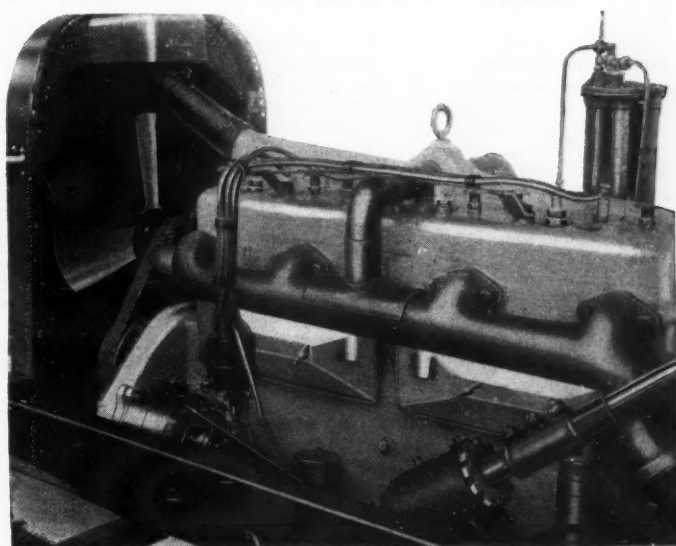
Rear Suspension

For suspension, the front springs are of the rear springs, which are cantilevers, are mounted directly under the frame side members and are attached to the rear spring seats by double spring bolts. The spring seats turn free on the axle housing. The forward ends are fastened to the frame by shackles. Bushings are provided for the spring bolts.

Demountable rims, with 34 x 4 tires, anti-skid, on the rear, power tire pump, one-man top, dimming headlights, are among the features of equipment.



Right side of the Mitchell motor, illustrating new location of the starting motor and the tire pump at the rear of the fan



Left side of Mitchell engine, showing accessible location of generator at front end with ignition distributor driven from it

justify its purchase many times. Tires should be carefully looked over following each trip, and tested for pressure every second day.

We would not advocate using different air pressure in the summer from that used in the winter. We recommend Ajax tire users at all times to inflate their tires to a pressure of 20 pounds per cross-section inch, that is, a 3-inch tire taking 60 pounds, 3½-inch, 70 pounds, 4-inch, 80 pounds and 4½-inch, 90 pounds. The writer has been informed by a motorist who has made actual road tests with regard to pressure variations and found that on testing the pressure on a hot summer's day before leaving the garage, and again after driving steadily for 90 or 100 miles and again testing the pressure there was but a variation of less than ½ pound, which increase would have no appreciable effect on the tire. — Ajax-Grieb Rubber Co.

Empire

Trenton, N. J.—Editor Motor Age—The subject of under-inflation has been thoroughly investigated, and it has been found that 35 per cent of tire destruction is caused by under-inflation: That is, the average owner would get 35 per cent more mileage from his tires if he would inflate them properly. We believe this is a very low figure.

The tire should be properly inflated in summer as well as in winter, as the increase due to the friction with the road or surface heat will be very little, but the increased pressure due to underinflation is accompanied by very intense heat due to the compression, and thereby very rapidly deteriorates the whole of the tire, particularly the fabric which is caused to chafe by the underinflation. The best gauge of a tire is that it will not flex nor become flattened at the point of contact with the road when the car is fully loaded.

A properly-inflated tire not only eliminates chafing of the fabric and deterioration due to the intense heat caused by compression, but also eliminates 90 per cent of the stone bruises and fabric breaks.

If a motor car owner will figure it out, he will find he can save far more money by properly taking care of his tires during the season than he can by buying gasoline even fifty per cent cheaper than now.—C. Edward Murray, Jr., Empire Rubber and Tire Co.

Lee

Conshohocken, Pa.—Editor Motor Age—With reference to air pressure on tires, wish to state that tires should be run in hot weather a few pounds under the required pressure if a long tour is to be taken; for ordinary running around and short trips it is always advisable to use the pressure scheduled for whatever size tire is used.

Regarding tire gauges, we believe that they are accurate enough to assist the car owner with the proper inflation.—Lee Tire and Rubber Co.

Miller

Akron, O.—Editor Motor Age—Miller tires should be kept at a pressure of 20 pounds to the inch. Inflate till they are round.

Normal summer heat is 66 degrees F. A 37 by 5 tire will develop 110 degrees F. when running, which shows an increase of 15 pounds air pressure.

Air gauges compare favorably with one another. Keep tires round.—Miller Rubber Co.

Braender

Rutherford, N. J.—Editor Motor Age—The gauge pressure on tires, which is figured 20 pounds to the inch of cross section, that is, 34 by 4 is 80 pounds, and 30 by 3, 60 pounds.

There is allowance to be made with rise of temperature in the summer; at least 8 to 10 per cent of the required pressure, so that 72 to 75 pounds would be sufficient in a 34 by 4 in the summer. Caution should be made to the user that water is contained in the air furnished by some of the garages. Unless the garageman protects against this moisture, he is bound to have water in his air tank. This can be avoided by a cup receptacle between the pump and the outlet nozzle.

A good many of the tire gauges are not accurate, and it is well for the car owner to compare the gauges with the garage gauge or another car owner's gauge every little while. The reason of this is that they are carried in the pocket or in a tool box gathering dust and dirt which is more or less injurious. This applies to gauges that are not protected from dirt.—Braender Rubber and Tire Co.

Hood

Watertown, Mass.—Editor Motor Age—Regarding the inflation of tires and the increase in pressure due to a rise in temperature, we have taken this matter up with our laboratory and experimental department who tell us that it is their belief that any increase in pressure caused by a rise in temperature is so small as to be almost negligible as far as affecting the wear of the tire is concerned, and that the present tendency among motorists to allow their tires to run underinflated would only be increased should they be educated to believe that greater pressure from rise in temperature would be harmful to their tires.—D. T. Hood, Hood Rubber Co.

Racine

Racine, Wis.—Editor Motor Age—In regard to inflation in tires in summer and winter will say that we have always and

do still advise 20 pounds to the inch. In other words, a 4-inch tire should carry 80 pounds of air. We advise this both in our fabric and cord tires.

We find that there is more danger, from our experience, of underinflation in the winter time than there is in the summer months. This is, no doubt, caused by the inconvenience and annoyance of inflating a tire under bad weather conditions causing the majority of owners to run their tires possibly 20 or 25 pounds underinflated, which ultimately causes breaking and cracking of the fabric.

In extreme hot weather, we are taking for example a 4-inch tire, which ordinarily calls for 80 pounds; we would advise from 72 to 75 pounds. However, in conclusion, we might state that the danger, even in the hot summer months, would be greater from underinflation than from overinflation.—Racine Auto Tire Co.

Victor

Springfield, O.—Editor Motor Age—We do not recommend different air pressures in tires to conform to the different seasons, as in our opinion the variation in temperature does not vary the air pressure enough to have any appreciable effect on the tires. Our recommendations are to keep tires inflated at all times over all roads in accordance with our published inflation schedule.

Tires which run continuously for hours will heat up whether running in hot or cold weather. This is due to frictional contact of the road surface and the internal working of the tire fabric or rubber which is constantly being distorted each revolution, thereby generating heat. If tires are not properly inflated there is more distortion of the casings, which generates more heat than if the tire is inflated with proper pressure.—Victor Rubber Co.

Ordinances from Behind the Wheel

(Concluded from page 9)

may be observed often that motormen display more consideration for motor car drivers than motormen in larger cities. Doubtless this is the result of his not having so many things to watch as the motorman in a large city running on a close schedule through crowded streets. Again it may be due to a rule of certain transit companies giving the right of way at intersections to the cars traveling in a northerly or southerly direction, or to cars going in another direction. When such a rule applies it causes motormen to watch each other at intersections rather than other vehicles, and it also results in one street car going ahead when a motorist might have expected the other one to proceed. The direction of right of way for street cars, however, will always correspond with the direction prescribed by ordinance for other vehicles in those cities which have adopted this system.

Street cars stop at the near side of the street in practically every large city. An exception is Denver, Colo., and the motor car driver who is not aware of the fact should put himself on the lookout.

The safety zones in cities where these have been established will indicate the distance to stop behind street cars or the distance to pass at the side. Los Angeles has recently established safety zones and

safety lanes in the shopping district, similar to those of Detroit, Mich. In the congested streets a driver need not wait for a street car to proceed if he can pass outside the lines of the safety zone, at a distance of 4 feet from the steps of the car. Otherwise he must wait, and in other parts of the city, the rule that motor vehicles shall come to a stop 10 feet in the rear of the street car is enforced.

The following cities have semaphore systems in operation: Boston, New York, Detroit, Indianapolis, Ind., Dayton and Denver, and several other cities are experimenting with semaphores. To arrive in a city where both the safety zone system and semaphores are in use and successfully keep one's eyes open for both, though unaccustomed to either, offers a splendid test of the motorist's skill. He who visits several cities and conforms to the diverse regulations of each and all of them has accomplished a feat that justifies some measure of pride. Even the seasoned motorist finds it difficult to acquire the knack of doing the right thing at the right time when driving in cities other than his own. A wise step in making preparations for a tour is to mail a request to every city one will visit, addressed to the chief of police or to the city clerk, requesting a copy of the traffic rules and regulations.

Tires, Their Care and Repair—Part III

(Continued from page 39)

layers of fabric and rubber themselves. The casing is a rubber tire reinforced with layers of tough canvas or other similar materials which are thoroughly imbedded or vulcanized within the rubber. But this outer tire or shoe must possess an appreciable thickness in order to withstand the terrific strains of driving and road inequalities. This means that the inner layers are made of a different length, or radius, of canvas and rubber, and therefore any tendency to flatten the tire will create the same effect as the endeavor to bend a pack of cards held firmly at one end. Each card will move separately from its fellows at the outer end, and it is this action which causes the tread separation of a tire which has been run with insufficient inflation.

Furthermore, this tearing, or tendency to rip apart the various layers, causes friction which induces heat, and this in itself is sufficient to separate the layers further and cause rapid deterioration of the rubber. The weakening of the tire at this point will be permanent, and only the unusual shock of a severe bump and skid, or a sudden application of the brakes will be required to strain this point beyond its limits, and a blow-out with all of its attendant possibilities will result.

But because a tire does not indicate insufficient inflation from its appearance as it rests on the garage floor it should not be assumed that it is pumped to its proper pressure. It is not the deflection of the tire when at rest that results in this tread separation and weakening of the fabric, but rather the rolling motion of the tire when the car is under way, and under these conditions the flattening may increase far beyond the point observable when the car is at rest. The use of an accurate pressure gauge or other measuring device is the only method by which proper pressure may be determined, and it behooves the motorist to watch this feature of car operation as religiously as he inspects his oil gauge or water level in his motor.—Kelly-Springfield Tire Co.

Goodrich

Akron, O.—Editor Motor Age—The B. F. Goodrich Co. has approached the much discussed question of tire inflation from a scientific standpoint by producing the Goodrich tire caliper. The caliper gets at the question of inflation from the angle of weight on the tires rather than number of pounds of air in the tires.

The tire gauge registers the number of pounds—and relies on the resistance of a coil spring to give the desired information, but the Goodrich company has found out from a series of exhaustive tests that no two gauges taken from stock will register alike—nor will a gauge that has been used awhile agree with a new one.

With the gauge the tire owners must rely on the cut-and-dried, inflexible table of pressure for certain sizes and make no allowance whatsoever for the weight of the car or the load carried. For example, a car like the Franklin, 2,566 pounds, equipped with 4½-inch tires must carry the same air pressure as a heavy car weighing 4,991 pounds, to say nothing of the load carried. If we are to be governed by tire gauges all the oversized arguments of tire manufacturers are useless—because if the heavy car can be amply tired with 4½-inch tires, why shouldn't the lighter car be entitled to more riding comfort, or less air pressure?

The Goodrich tire caliper is based on size and load. If a tourist desires to carry seven passengers and baggage where ordinarily he

carries two or three, then the caliper shows him exactly to what point he must inflate to make up for the excess weight.

We do not recommend any variation in inflating of tires one season as compared with another. We have found that the atmospheric temperature was of so little influence on the pressure at any season of the year that little or no allowance need be made on this account.—B. F. Goodrich Tire and Rubber Co.

Michelin

Milltown, N. J.—Editor Motor Age—We welcome anything which tends to educate tire users and, as you doubtless know, have made it a definite part of our progress for many years past to do all we can in this direction. We have recently published two booklets illustrating some of the more common injuries to casings and tubes, and showing how they may be avoided with due precaution. These books will be sent to any motorist post paid on request.

We do not recommend different pressures in summer and winter. We have found by experience that the additional pressure arising from an increase in the atmospheric temperature is insignificant from the point of view of its effect upon the tire, and our pressure and load tables having been compiled with due regard to all these factors are those we have found to give the best results in practice. We do not think the changes of temperature, even in the most rigorous climate, would cause sufficient increase or decrease in air pressure to do anything like as much harm to a tire as would be occasioned during the periods when tires would be running insufficiently inflated, if the practice of starting off with a very low pressure in summer became general. We enclose the pressures and loads we suggest for each sized tire.

Regarding the tire gauges in garages, we believe, generally speaking, these gauges are fairly reliable. We think, however, it would be a wise precaution for every motorist to carry a reliable pocket gauge of his own and use it constantly to verify pressure after each inflation.—Michelin Tire Co.

Firestone

Akron, O.—Editor Motor Age—The following, taken from our series of booklets for motorists on the care of tires, "The Way to More Mileage," presents our stand on tire inflation:

Ordinarily, the tires on front wheels should be inflated between 15 to 18 pounds per inch of tire section (34 by 4—15 by 4=60 pounds, or 18 by 4=72 pounds), and the rear tires 15 to 20 pounds per inch of tire section (34 by 4—20 by 4=80 pounds).

Resiliency of the tires is primarily governed by the construction and quality, but is largely influenced by the inflation and weight carried. Naturally a 4-inch tire inflated to 70 pounds air pressure and carrying 800 pounds weight will ride easier than the same size of tire with the same inflation, and carrying 700 pounds weight. The heavier weight causes more deflection of the tires on the ground and increases the action of the side walls, thereby adding to the comfort of the ride. Increasing the deflection or flattening of tires, either by extra weight or reducing the air pressure, causes more of the vibration to be absorbed by the tires rather than by the springs of the car.

When soft, the tire runs against a wave in the tread rubber which will from excessive stretching and heating, pull away and separate from carcass or body.

There seems to be an impression of dan-

ger from blowouts due to expansion, especially during the hot weather. There is some expansion, but, as a matter of fact, it is not in proportion to the increase in temperature, for example—if the temperature of the air in a tire increases from 60 to 80 degrees, it does not follow that the air pressure per square inch increases from 60 to 80 pounds. It actually means an increase of 3 pounds pressure per square inch, i. e., the pressure increases from 60 to 63 pounds.

We believe the most satisfactory inflation method is to pump up the tires in accordance with formula then, if necessary, reduce the pressure slightly until they do not cause excessive vibration to the car and traction slippage of the rear wheels. Make a record of the pounds pressure at this point and, if always maintained, the greatest efficiency from tires and car will be enjoyed.—Firestone Tire and Rubber Co.

Swinehart

Akron, O.—Editor Motor Age—The arguments for keeping a tire properly inflated are established and used by all manufacturers of tires. Also, we have probably established air capacities and loads which our tires are supposed to take. Therefore, I shall concern myself with the increase air pressure in pneumatic tires found from the time the car is taken off a cement floor, and run in the sun on a hot street. We have made the following experiment:

On an exceptionally hot day a car which had stood in a reasonably cool garage with the air pressure in the tires at or nearly at the correct pressure, was running rapidly through downtown Akron streets at midday in the blazing sun. One and one-half hours later the air pressure was again taken and less than 7 per cent increase pressure was found, or approximately 5 pounds on a 4-inch or 4½-inch tire.

We are of the opinion that the pressure which a tire should be inflated regardless of the weather should be the pressure specified by the company selling the tires, except on very hot days when the tire has been in a cool garage, when the tire should be started out with a pressure approximately 3½ per cent less than specified pressure. The standard pressure gauges are accurate enough for pressure testing.—Swinehart Tire and Rubber Co.

Pennsylvania

Jeannette, Pa.—Editor Motor Age—No allowance should be made in the inflation pressure of Pennsylvania tires for differences in weather conditions. The air pressure should be constant according to the low, as indicated in the table herewith.—Pennsylvania Rubber Co.

Federal

Cudahy, Wis.—Editor Motor Age—The inflation of Federal tires should be the same in summer as in winter, and should be that shown in the tables.—Federal Rubber Mfg. Co.

Ajax

New York—Editor Motor Age—Failure to maintain proper inflation is the great common fault of motorists. The air pressure inside the tire must equal the pressure of car weight and driving force; or the two should approach each other closely. Perhaps ninety per cent of tires are not kept sufficiently inflated. Tires should be regularly inspected for pressure. A new spring in a valve may stop a slow leak and maintain the pressure.

The small cost of a pressure gauge will

price per set with straps, packed in individual cartons, is \$3.25.

R & M Piston Rings and Pistons

The R & M piston ring herewith illustrated is made in three parts, these being a bull ring, V-shaped, and two conform rings of corresponding angles so as to permit their riding on the other. This construction comprises the advantage of the sealed joint and uniformity of contact with the cylinder wall. These rings and also the R & M Maluminum pistons are made from an alloy known as maluminum. Its weight is only 30 to 50 per cent as much as cast iron. It possesses a tensile strength of 30,000 pounds per square inch and an elastic limit of 20,000 pounds per square inch. The R & M rings and pistons are made for all cars. Prices for R & M piston rings range from \$1 to \$1.50 net. They are the products of the Modern Electric & Machine Co., Indianapolis, Ind.

Stover All-Steel Bodies

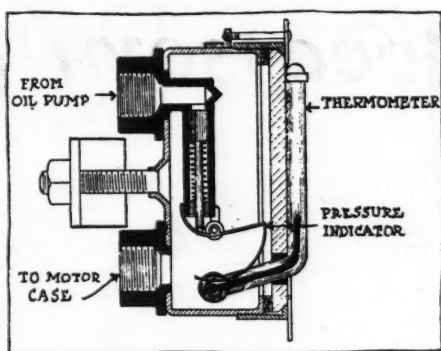
The Stover Steel Tank Co., Freeport, Ill., is introducing its new all-steel bodies for commercial cars and motor trucks. The Ford commercial all-steel body is made entirely from one piece of steel with the exception of the hinged end-gate. Under this form of construction, the makers entirely eliminate metallic sounds from riveted joints. In addition, the company is making all-steel express and stake bodies, ranging from the smallest to the 5-ton trucks.

Pulley-Grip in Smaller Size

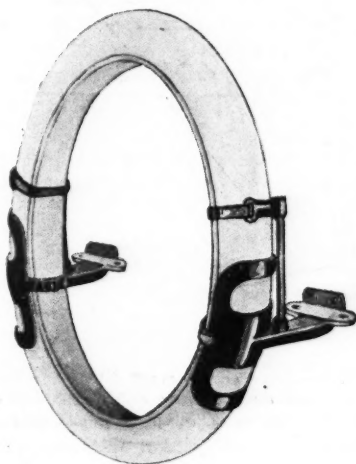
The Pulley-Grip Co., Milwaukee, Wis., which has been marketing a chemical compound for application to pulleys in factories and workshops to minimize belt slippage, is now putting out the preparation in a small size for use on fan and motor pulleys on pleasure and commercial cars. It is claimed that the use of Pulley-Grip will not only keep the fanbelt from slipping, but preserves the belt and saves bearings. The article is being used widely in all parts of the country by the largest manufacturers. It is stated that several truck and motor builders are equipping all belt-driven mechanisms with Pulley-Grip as standard equipment as a preventative of overheating on heavy-duty motors especially. R. B. Henning is manager of the Milwaukee company.

Westinghouse Charging Outfit

The Westinghouse Electric & Mfg. Co. of East Pittsburgh, Pa., has developed a rectifier outfit which consists of a transformer-reactance and Cooper-Hewitt rectifier bulb mounted on a cast iron frame. The transformer is so arranged as to deliver, without the use of extra resistance or reactance coils, the gradually decreasing current best suited for battery charging. Terminals are provided for connecting the alternating-current lines and the battery circuits to the outfit. Fuses for overload protection are placed in both the alternating and direct-current circuits. A simple starting switch, the two link connectors, by means of which transformer



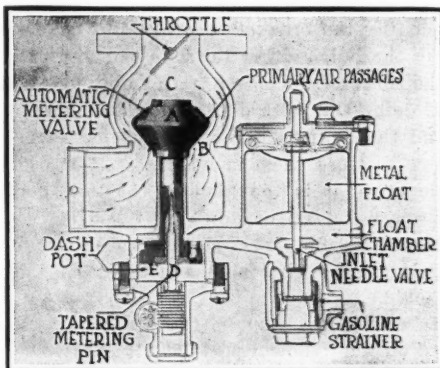
Climax motor indicator which combines a pressure gauge and indicator



Rear tire holder designed especially for the Chevrolet



Section of the R & M piston ring



New Stewart carburetor for Ford cars

connections are changed to suit any particular battery and line voltage within the limits of the outfit, are additional features. This outfit has been designed primarily for the car owner who is not an electrical expert.

Weldex Gasoline Storage Outfits

Gasoline storage equipment bearing the name "Weldex" has recently been placed on the market by the Weldex Manufacturing Co., Richmond, Va. The Weldex line includes a complete underground system of storage tank and pump, faucet tanks,

and cone-bottom filter tanks for dry cleaners. The Weldex rotary is designed for private garages. Measuring pumps will be supplied upon request. The tanks are constructed in sizes from 65-gallon to 550-gallon capacity, ranging in price from \$12.75 to \$70, the figures including double fill-up, and the suction and strainer. All joints are welded, no solder or rivets being used. The Weldex company manufactures wagon tanks for gasoline also.

Stewart Carburetor for Fords

A special Stewart carburetor for Ford cars has been added by the Detroit Lubricator Co., maker of the Stewart. This instrument works on the same metering-pin principle as the other Stewart instruments, but is designed for the needs of the Ford engine. Besides the carburetor itself, a manifold, hot air connections, dash adjustment and all fittings are included in the outfit as retailed at \$15.

The principle of the Stewart carburetor may best be understood from the sectional view. The metering valve A rests upon the seat B when the engine is not running, but as the engine begins to rotate, the suction raises the valve from the seat, drawing in air around it from the air intakes. This suction also draws gasoline up within the valve stem, this mixing with the incoming air in the chamber C. The Stewart has but one adjustment, that being for the amount of gasoline. The air is a fixed amount, it being simply necessary to regulate the amount of gasoline admitted. This is controlled by the tapered metering pin D, and the adjustment is made when the engine is running at idling speed. When the right proportion has been determined at slow speed, it is evident that as the speed of the engine increases, the metering valve A raises higher from its seat and away from the metering pin D. This allows a greater supply of both gasoline and air to be admitted in the right proportions as predetermined when designing the instrument.

In the Ford type of Stewart carburetor the float bowl is furnished in either one or two positions. Some Fords are specially equipped with a high-tension magneto, in which case it will be necessary to have the bowl at right angles to the air port or between the carburetor body and the hood base of the car. Where there is no high-tension magneto installation, the float bowl is placed at 180 degrees to the air port, or forward of the carburetor body.

Non-Oiling Tire Pump

The quality tire pump, made by the Taylor Mfg. Co., Detroit, Mich., makers of the well-known Taylor crankshaft pumps, is an improved, non-oiling apparatus of the type already known under the Taylor trademark. This company is the owner of the basic patents covering pumps that are driven from the end of the motor shaft. No oil is used either in the air chamber or crankcase. It is quickly detachable and as easily installed.



The Accessory Corner



Ward Leonard Resistance Unit

A COMPACT unit of high resistance and of moderate current carrying capacity has been brought out by the Ward Leonard Electric Co., Bronxville, N. Y. The resistance material is made up of units of wire of practically zero temperature coefficient, wound on porcelain tubes and covered with a vitreous enamel. The resistance wire is embedded in a substance which expands and contracts at the same rate as the wire does itself within the limits of ordinary usage.

This harmonious expansion and contraction prevents adjacent turns of wire from closing together and short circuiting. The vitreous enamel in which the wires are embedded and by which they are entirely covered, protects them from the atmosphere. As the entire wire is hermetically sealed in this way it cannot deteriorate owing to the action of atmospheric moisture or other corrosive elements. The coating of enamel over the wire is thin and is a good conductor of heat, thus keeping the temperature low by dissipating the heat.

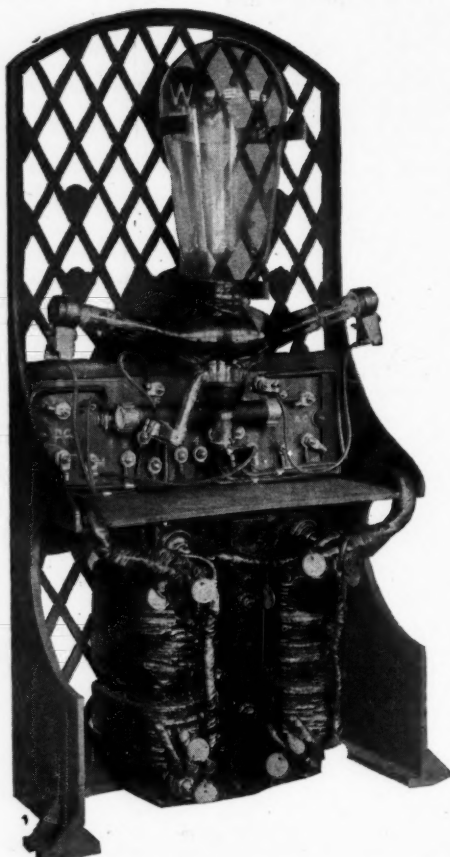
By the practically zero coefficient of the resistance wire is meant that its resistance does not alter with changes of temperature and this is an important factor in practical installations. Mechanically the resistance units are strong, being compact, non-abrasive, rustproof, waterproof, fireproof and dustproof.

Economy Piston Ring

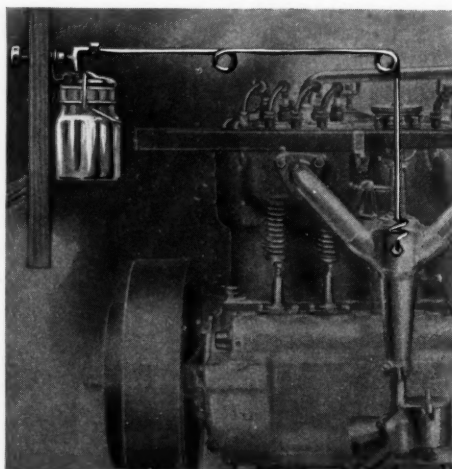
The Economy piston rings have been put on the market by the American Piston Ring Co., a company organized only recently at Minneapolis, Minn. These rings differ from many in general use by not having pins to secure them in position. The illustration shows the method of joining the ends of Economy rings, with a tongue-and-groove device. They are concentric. In theory a concentric ring is said to insure equal bearing on the walls of the cylinder and consequently an even wear on the rings. This, and the absence of pins and loose parts, promote full compression, as the ends of the rings can be sealed so tight as to prevent any leakage whatever at the joint. The rings range in prices from 90 cents for 2½ to 3½-inch diameter, to \$2.25, for 6 to 6½-inch diameter.

Cleaning and Priming Device

F. A. MacDonald, former racing driver and mechanic for the late Bob Burman, has invented a cleaning and priming device for motors which is being manufactured at Grand Rapids, Mich. It consists of two glass containers. These are interchangeable, and are connected, through a needle valve, by a copper tube to the man-



Westinghouse charging outfit which consists of a transformer-reactance coil and a Cooper-Hewitt rectifier both mounted on a cast iron frame.



MacDonald clearing and priming device



The Economy piston ring which does not make use of a pin

ifold. The valve is governed by a button and the whole apparatus is fastened to the dash. For priming, a solution of one pint of high test gasoline and a half-ounce of commercial ether is placed in the container. The charge is released by the button and passes, by the siphon process, to the cylinders just after the engine is stopped. It remains in the cylinders until the engine is turned over, when it is fired instantaneously. For cleaning purposes the second container is used when filled with a solution of salt and water. As the contents of the jar are released, the extreme heat of the motor superheats the salt which oxidizes the light carbon dust. The water is vaporized when it hits the firing chamber and becomes superheated steam, which drives the oxidations through to the exhaust.

Climax Motor Indicator

This device combines a pressure gage, motor indicator and oil sight feed and is mounted on the dash. The makers rely on the lubricating oil of the motor for registry, referring to it as "the blood of the motor," as it comes into contact with all the working parts. No matter how high the pressure may run when the motor is cold, the instrument is not affected by the additional strain imposed on it by such conditions, according to the manufacturers. The oil gage enables the driver of the car to see whether or not the oil is circulating properly and the indicator registers the temperature of the oil on the thermometer as it passes through the gage. When the thermometer registers "no higher" than the atmospheric temperature the oil is not working. The indicator sells for \$5. It is produced by the Climax Motor Devices, Cleveland, O.

Goodyear Tire-Saver Kit

This kit is designed to enable car owners to increase the mileage obtained from their tires by applying first-aid measures before serious troubles develop. It contains a rim cut patch, an outside protection patch, a No. 4 self-cure patch, a 2-ounce can of repair tape, a 2-ounce can of patching cement, a 2-ounce can of tire putty, a pressure gage and a tube of French talc. For tires of 3 and 3½-inch diameter, the kit sells for \$3.50; for 4 and 4½-inch, \$3.75, and for 5 and 5½-inch, \$4. The Goodyear Tire & Rubber Co., Akron, O., supplies the kits.

Tire Holder for Chevrolet

The Auto Parts Mfg. Co., Milwaukee, Wis., is offering a new rear tire holder for Chevrolet cars under the Badger trademark of that company. It attaches to the rear body sill by means of through-bolts and holds the tier in a horizontal position. The

The Motor Car Repair Shop

Focusing Your Headlights

How This Should Be Done
to Give the Best Driving
Lights

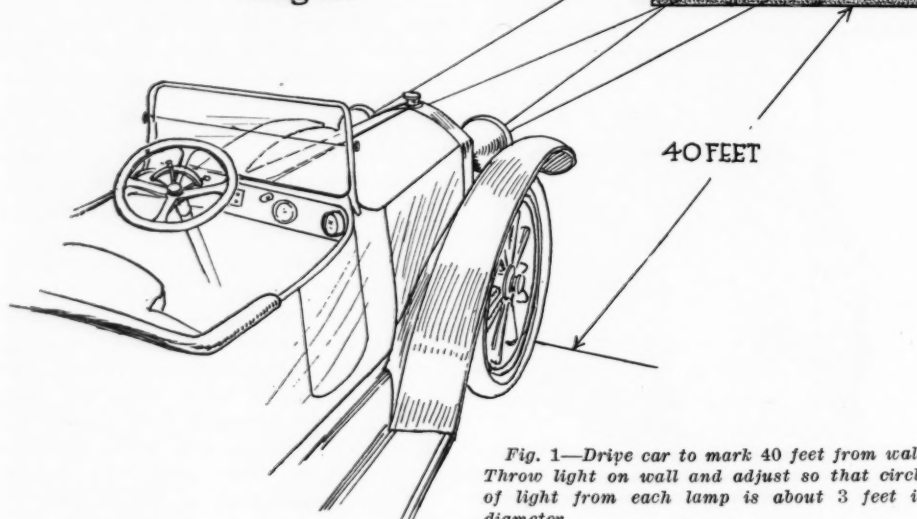


Fig. 1—Drive car to mark 40 feet from wall. Throw light on wall and adjust so that circle of light from each lamp is about 3 feet in diameter

FEW of the many thousands of cars in service may be said to have their headlights properly focused to give the best light for country driving. In the cities the focus does not matter much, for in nearly all municipalities the authorities require either dimming of the headlights, anyway, or the use of side lights, but it is in the country, especially on dark nights, that the motorist wishes he had better light. So he stops the car, bends the lamps and brackets a little this way and a little that, screws the bulbs in or out, and attempts to produce a better illumination. He does not accomplish much for he has not gone about the job in a systematic, careful and accurate manner. You cannot properly focus the headlights and adjust them without measuring their light on a range.

The best way to do is to drive the car to a place where the lights can shine on a wall, and then adjust them so that each does its proper share of the illuminating in the proper way. Of course the headlights in different cars vary, and probably distances and dimensions which would properly focus the majority of headlamp installations might not do for every make of car. The best we can do here, however, is to give directions which ought to cover most cars which have lights of the usual size and reflecting possibilities.

The Proper Method

The method given is that followed by the Hudson company, and it covers the point in what seems to be the simplest way. Drive the car to a mark which is 40 feet from a wall, as shown in Fig. 1. Best

results, will, of course, follow if the procedure is carried out in the dark. Throw the lights onto this wall, and adjust them so that the circle of light from each lamp will be about 3 feet in diameter, and the edges of these circles will just touch as shown. They should also be $1\frac{1}{2}$ feet from the ground at the lowest point of the circles.

This adjustment can be obtained both by bending the brackets slightly and by moving the bulbs either towards or away from the reflectors. There are a number of ways of doing this with different types of lamps, and the motorist undoubtedly has learned how to work them in his case. If the circle of light is too high or too low, bend the bracket up or down as the case may be; also bend it slightly to the left or right if the circles do not meet as they should.

Headlight Courtesy on the Road

You know how very difficult it is to see when you are approaching another machine with glaring headlights. You are simply blinded and cannot tell whether you are running off the road, are too close to the oncoming machine or are striking obstructions. It is a peculiarly helpless feeling to be directing a car when confronted by the other fellow's glaring lights in this way.

If your headlights are on, he is in just the same predicament, however, and it is the least either of you can do to dim the headlights while passing. This is a safety factor as well, for it protects both from running into one another or off the road.

There are drivers who have no respect for anyone and who drive with their glaring lights on constantly, but you will usually find that if you dim your lights when you see another car coming toward you, the driver of that machine will extend the same courtesy to you, and will dim his lights also.

Motor Age realizes that there are many cars which have no provision for such dimming of the lights, but in such cases you cannot help yourself and must make the best of the other fellow's glare in full realization of the fact that he is suffering from yours just the same way.

One motorist, who to the writer's knowledge does a considerable amount of night driving, has had the switch wiring so arranged that a flexible cord with a push button reaches to either of the front seats, and when his wife is along she simply holds this button and dims the lights when she sees another car approaching. When alone, this motorist fastens the buttons conveniently to the steering wheel, and he can thus turn down his lights with no reaching or trouble of any kind. His scheme is an excellent one, for on roads that are much traveled it is tiresome sometimes to have to reach over to the instrument board every time you wish to dim the lights on seeing another car coming. Possibly some of our car makers will take the hint and fit such a convenient dimming switch on their cars, since they are constantly looking for ways and means of still further refining their vehicles and making them convenient under all conditions.

Dim Your Lights

Some states and localities have passed laws and others are following suit to regulate the use of headlights on motor cars, but it seems almost foolish to have to compel a driver to do that which is primarily for his own safety. Common sense ought to tell us to use our lights in a logical manner without requiring laws. Yet there are a great many who need some sort of legal force to make them do it. Headlight regulation is really more than mere courtesy, and the laws should compel sane use of them if it can be obtained in no other way. Get out of the road-hog class and remember that others have rights as well as yourself. Otherwise, increase the size of your motor car insurance policies.

Where a great deal of night driving is done or a cross-country trip made, a spot light is of great convenience. It is fastened close to the driver's hand and can be directed at any spot desired, to say nothing of its help when anything goes wrong about the car. Think of the convenience of a spot light to play on the stalled motor on a dark night.

Through a combination of artist's mis-

take and a typographical error, Motor Age published its directions for finding the gear ratio of the rear axle with an incorrect statement therein. Suppose we turn back to page 26 of the March 23 issue and get this straightened out. The directions for finding the ratio when no relation between the speed of the car and the speed of the engine was known is slightly wrong in that instead of saying to jack up *both* rear wheels, the type matter says to jack up one of the rear wheels. Unfortunately, in making his drawing the artist, while he had the right idea in mind, failed to show but one wheel jacked up instead of both. The caption is correct, however, for it says to jack up the rear wheels.

The mistake is in the fact that with only one wheel off the floor and free to rotate, the differential action would cause the one free wheel to turn twice as fast as it would if both wheels were free to revolve. Thus, the number of revolutions of the engine would have to be half as many with only one wheel off the floor. That is, to determine the ratio, revolve the crankshaft until the wheel has made a complete revolution, as shown by the reference mark on the tire and floor, and if the engine has been turned $1\frac{3}{4}$ revolutions, the gear ratio is $3\frac{1}{2}$ to 1. But if both wheels are off the floor, the engine would have to revolve $3\frac{1}{2}$ times to one revolution of the wheel if the ratio is $3\frac{1}{2}$ to 1.

No better proof of the interest which Motor Age readers take in the Repair Shop section could have been obtained than through the printing of this slight error. We have had a large number of our readers call our attention to it, and we wish to thank them for their interest. Such a result not only proves that many have a thorough knowledge of motor cars and their mechanisms, but it is striking evidence of the fact that the pages of Motor Age are read thoroughly and carefully.

No harm can come to the engine if you use it as a brake sometimes, thus saving the wear on the brake bands. When going at considerable speed, you can slacken up by shutting off the throttle and lowering the spark somewhat, thus causing the lessening of the engine speed to cut down the car speed. Leave the clutch in and do not disengage it until you are running about 5 miles per hour. Then throw out the clutch and apply the brakes. That is much better than making the brake bands take all the wear of retarding the motion of a rapidly moving vehicle without other help. It does not hurt the engine any, since the slowing up simply acts against the compression in the cylinders. Advantage can also be taken of the motor as a braking agent when ascending hills, saving the brake linings for times when their use is imperative.

Give Carbureter Fair Chance

"Before you let someone substitute another for the carbureter on that old car of yours—the one the maker put on—just do a few things that the salesman of the other

will insist upon doing anyway before he proves what his carbureter will do," says Horace T. Thomas, chief engineer of the Reo Motor Car Co.

"Mind you, I don't say that there may not be a better one—for the world moves and great improvements have been made from time to time in carbureters.

"But before you discard the old trusty one do these things: Clean the cylinders—remove the carbon and run kerosene through to loosen up the rings which may have become gummed. That will restore the compression. Now grind the valves and in putting them back adjust them carefully as your instruction book tells you. Adjust all motor bearings, too, and see that your clutch is in good condition. Oh, yes, a clutch may have a lot to do with the performance of a carbureter. Also look to the ignition system—clean the plugs, adjust the points and see that the sparks are accurately timed. Nor forget the cooling sys-

tem—if radiator or cylinders have become clogged with lime or other deposits, temperatures will change so rapidly it will be impossible to maintain any carbureter adjustment—that which seems all right for the moment will not do after a few miles. A good boiler compound will remove the deposit and restore the cooling system to the former efficiency and regularity.

"The wise carbureter salesman insists on doing these things before trying out his better carbureter, if you insist on proof before buying, and, of course, the new broom sweeps clean. So would the old one, given the same chance by proper tuning of the motor.

"Most of this talk about the high cost of gasoline and short mileage per gallon would cease if owners did those simple things more frequently—and it will stop anyway with the war, for then prices will return to their normal level while the increased efficiency will continue."

Vim Mail Wagon Sells for \$800—Is Built According to Government Plans

A NEW model of the Vim delivery car has been added to the seven standard types already regular products of the company manufacturing this type of car. This new design is to be known as model M and is intended for service in different branches of the postal service.

Some time ago the Vim Motor Truck Co. received an order from the United States government for a mail-carrying vehicle to be built in accordance with strict specifications.

Its standardization as one of the Vim models came as a natural sequence of the government order.

The body has full screens all around, with doors both front and rear; passenger step at back for use of mail carrier and all such other special equipment as the government requires.

The chassis is the standard Vim chassis and, with the new body, sells for \$800.

STOVER TRACTOR AT FREEPORT

Freeport, Ill., April 15—The Stover Engine Works and the Stover Mfg. Co., this city, will be merged into a new corporation to be known as the Stover Mfg & Engine Co. The new corporation, capitalized at \$3,000,000, will manufacture the Stover tractor.

FORD HIGHWAY PROJECTED

Detroit, Mich., April 15—The Ford highway, 12 miles long, 150 feet wide and double track, has been projected to connect the Ford factory in Highland Park with the tractor plant in the River Rouge district. It had received the approval of the mayor of Detroit.



New Vim mail delivery wagon which sells for \$800

From the Four Winds



A PART of the first company of the California Motor Reserve Corps—The picture was taken in Los Angeles and shows the motorist reserves in full uniform in their 1916 Maxwell cars. Lieut. Lyman P. Clark, at the wheel of the first car, is in command of the corps.

TO Organize at Addison, Me.—The Addison, Me., owners and dealers have been holding meetings recently for the purpose of forming an organization. It is expected that officers will be elected shortly.

Jersey Tags For 1917—The color of New Jersey's license tags for 1917 will be sky blue, with white numerals, the motor vehicle department having decided that white letters on a dark background made the most effective combination, the 1916 tags being white on Brown. Hereafter, New Jersey's tags will be made by prison convicts at a saving of many thousands of dollars.

Novel Means for Transporting Cars — Many unique and novel means have been used to get cars to dealers by the manufacturers in the last year, but seldom is the demand for cars so great that a sufficient number to satisfy could not be run to the selling point on their own power if occasion demanded. However, it appears that someone is going to run cars on roads that are so deep with snow that they must be transported to the waiting buyers on sledges as this was done between Montpelier, Ida., and Afton, Wyo., with a shipment of Overlands.

Milwaukee Safety Commission Elects — Chief of Police John T. Janssen, Milwaukee, Wis., has been elected president of the Milwaukee Public Safety Commission at the third annual meeting. Gen. Otto H. Falk, who served two terms as president, consented to take the first vice-presidency. Other officers are: Second vice-president, Prof. Leo Tiefenthaler, municipal reference librarian; secretary, R. L. Frost, assistant secretary, Merchants and Manufacturers' Association; treasurer, Charles W. Lamb, safety division, Milwaukee Electric Railway & Light Co. The commission has accomplished remarkable work in the direction of minimizing traffic accidents. To make its work more efficient, an investigator and paid secretary will be engaged to search out con-

ditions and make reports with recommendations.

Women Raise Street Funds—The women of Blue Grass, Ia., are financing a movement to oil all of the streets. The council refused to appropriate money for this purpose and the women arranged a bazaar to raise the requisite funds.

Ohio Associations to Consolidate — The movement to consolidate the Columbus Automobile Trades Association, formerly known as the Columbus Garage Owners' Association and the Columbus Auto Trades Association, an organization of dealers, is progressing satisfactorily at Columbus, O. A meeting is scheduled for next week, when the members of both organizations will discuss the question of merging. It is pro-

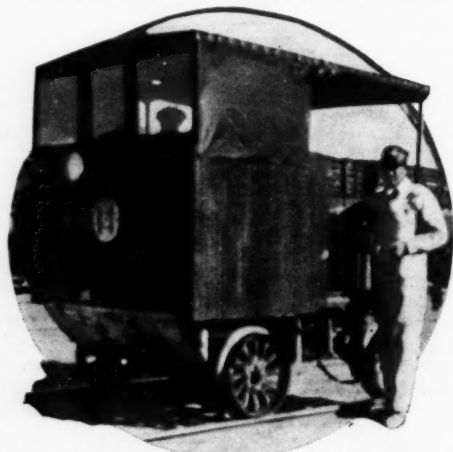
posed to name the consolidated organization the Franklin County Automobile Trades Association.

Association After Car Thieves—The Clinton Automobile Dealers' Association, Clinton, Ia., is behind a movement to assist the county prosecutor in rounding up the gang of motor car thieves that has been infesting that part of the state for several weeks. A fund has been raised for this purpose.

Rainier Park Admission Schedule—A new schedule of admission charges for motor cars in Rainier National Park now is in effect. These charges will be \$4 for the single park admission of the machine, or \$6 for a season, which means that a car owner can make as many trips to the park in a season as he wishes. These fees apply only to cars on pleasure trips. Such owners are subject to a heavy fine if they carry passengers for hire.

Iowa Tractor Demonstration—The dates for the big tractor demonstration to be held at Cedar Rapids, Ia., this summer are August 14 to 18, inclusive. Options have now been taken on over 1,000 acres of land along the Iowa City Interurban. Plans are being made to make the tractor demonstrating a big Iowa homecoming and to entertain at least 35,000 people. There will be from 30 to 60 carloads of tractors. The local committee in charge is A. S. Hammond, chairman, A. G. Thurman, J. H. Trewin, John C. Fuchs, Glenn Averill, J. L. Mattson, Joe McCormick and George Berge.

Triumph For Jay-Walker—The New Jersey legislature has amended the motor and road traffic act of 1915 by giving pedestrians the right of way over all vehicles in the built-up portions of cities and towns, repealing that section of the act which provides that any person crossing a street at any other point than the regular crosswalk does so at his own risk. This is a triumph for the jay-walker, as he is known, who crosses the public street at any angle and any time according to his own convenience. This unconventional mode of crossing has become famous as a "Jersey cut," and Jersey seems willing to retain it.



USED Along the Border—It is a common railroad hand truck powered by a four-cylindrical Beaver with a 5 to 1 spur gear drive through single disk clutch. Drive on front axle. An E. F. M. radiator is attached to the limousine body. Makes a speed of over 30 miles per hour; few grades over 2 per cent. Just before this was snapped the engineer was working about with an oil can as long as his car, but my train pulled out so couldn't get a good pose.

Good Roads Activities

Hawkeye to Rival Lincoln—The Hawkeye Highway association is planning to make this road a greater highway through Iowa than the Lincoln highway. Twelve counties are behind the movement to improve this road and to advocate its use as the principle trans-state highway.

Roses Line Trail—To make the famous Columbia River highway in Oregon even more attractive for the motorist, the highway in the Cooper Falls and Bridal Veil districts has been lined with roses. It is the wish of people living in these districts to make their stretch of road as attractive as possible.

Light Leaves American Highway—Charles P. Light announces that his connection with the American Highway association as field secretary will cease with the current month, and that beginning May 1, 1916, he will associate himself with the Fidelity Mutual Life Insurance Co., Philadelphia, in a managerial capacity.

Ohioans Speed Dixie Work—Speed in the completion of the Dixie highway through Hamilton County, O., is urged upon the county commissioners by the Hamilton County Dixie-Highway Council. A committee consisting of Harry R. Probasco, chairman; R. H. Coney and J. Stacey Hill, to act in conjunction with the Ohio Dixie Highway Commissioners, Harry L. Gordon and George W. Harris, was appointed to wait on the county commissioners at their next meeting to discuss the matter with them.

Crushed Stone Association Formed—To promote the interests of producers of rock material for highway construction, the Wisconsin Crushed Stone Association has been organized. Headquarters will be at Fond du Lac, Wis., and R. W. Scherer, former sales manager, Trap Rock Co., Minneapolis, engaged as secretary and manager. Although Wisconsin is already one of the largest users of crushed stone for highway purposes because of the enormous amount of concrete and macadam roads now being built, the association will attempt to promote such use further as well as fix standards and systematize the business.

Ohio Roads Improvement—Road contracts embracing improvements on approximately 125 miles of main highways in the Buckeye state have been awarded by the Ohio highway commission, upon bids opened April 7. The work is to start in the near future and completed during the present season. The highway commission will open bids April 28 for about 100 miles more of road improvement. In all several millions of dollars will be spent in the road construction under the auspices of the highway commission. In addition, a large amount of road improvement will be undertaken by the county commissioners in many of the Ohio counties.

Laying Out Illinois Road—Directors of the Illinois Valley Way Association are engaged in laying out the route between Chicago and Peoria. There is some uncertainty concerning the routing through Henry and Grundy counties. Princeton and Depue both want the highway, but it is possible only to go through one. The line thought most desirable will be selected by the committee. A type of concrete marker has been adopted which consists of a concrete post, 11 feet in height. On the top is a square target with the letters "I. V. Way." On the reverse side will be the name of the township, county or other information of importance to the tourist. It is planned to install about 1,000. The committee has received a request from Springfield to continue the route to that city. This will be considered after the route between Peoria and Chicago is marked.

Coming Motor Events

CONTESTS

- *April 29—Road race, Fresno, Cal.
- *May 6—Sioux City, Ia., Speedway race.
- *May 13—New York, Sheepshead Bay speedway race.
- *May 20—Chicago speedway amateur's race.
- *May 30—Indianapolis speedway race.
- *May 30—Tacoma, Wash., speedway race.
- *May 30—Minneapolis, Minn., speedway race.
- *May 30—Track meet, Elmira, N. Y.
- *June 4—30-mile race, Sheepshead Bay speedway.
- *June 10—Chicago speedway race.
- *June 20—100-mile race, Galesburg, Ill.
- *June 23-24—Interclub reliability run, Chicago.
- *June 26—Des Moines, Ia., speedway race.
- *July 4—Minneapolis speedway race.
- *July 4—Sioux City speedway race.
- *July 4—Track meet, Coeur d'Alene, Ida.
- *July 4—Road race, Visalia, Cal.
- *July 4—Track meet, Elmira, N. Y.
- *July 15—Omaha, Neb., speedway race.
- *July 15—Track meet, North Yakima, Wash.
- *July—100-mile track meet, Burlington, Ia.
- *August 5—Tacoma, Wash., speedway races.
- *August 11-12—Hillclimb, Pike's Peak, Colo.
- *August 12—Track meet, Portland, Ore.
- *August 18-19—Elgin road race.
- *August 26—100-mile track meet, Kalamazoo, Mich.
- *September 4—Indianapolis speedway race.
- *September 4—Des Moines, Ia., speedway race.
- *September 4-5—Track meet, Spokane, Wash.
- *September 4—Track meet, Elmira, N. Y.
- *September 16—Speedway race, Providence, R. I.
- *September 29—Track meet, Trenton, N. J.
- *September 30—New York, Sheepshead Bay speedway race.
- *October 7—Philadelphia speedway race.
- *October 7—Omaha speedway race.
- *October 14—Chicago speedway race.
- *October 19—Indianapolis speedway race.
- *October 21—Track meet, Kalamazoo, Mich.

* Sanctioned by A. A. A.

CONVENTIONS

- June 12-16—S. A. E. annual cruise, Lake Huron and Georgian Bay.
- May 9-12—National Asso. of Automobile Accessory Jobbers, spring meeting: Hot Springs, Va.
- May 19—A. A. A. annual meeting, Washington, D. C.

With the Motor Clubs

Zanesville May Have Club—A meeting of car owners was held at the Chamber of Commerce, Zanesville, O., last week, for the purpose of organizing a motor club. Many of the owners have shown enthusiasm in the preliminary arrangements.

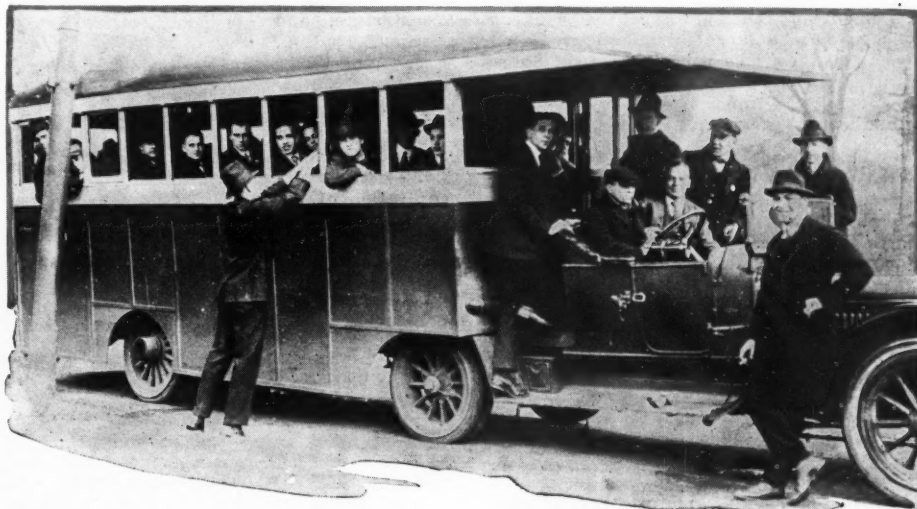
New Hampshire Club Planned—Plans are maturing to form a motor club at Derry, N. H. A number of motorists in and around that town have had meetings and they will organize as soon as the weather permits good driving so out of town people may motor in.

Topeka Club Will Support Trail Body—The Topeka Automobile Club, Topeka, Kans., has extended its support to the Midland Trail Association to provide a well-kept road across the continent. A committee of three was appointed to act in getting members for the association as auxiliary to the local club.

Hartford Club's New Emblem—A new name plate or radiator emblem has been adopted by the Automobile Club of Hartford, Conn. It comprises a flat enameled disk bearing the initials of the club. The design proper is that of a motor car wheel. These emblems are retained on the radiators by means of long steel rods threaded to take a nut. Nearly every member in the club has one of the emblems on his car.

Fort Madison Club Elects—The Ft. Madison Automobile Club, Fort Madison, Ia., has organized with a membership of 115. Officers elected are: President, W. H. Clements; vice-president, A. H. Houston; secretary, A. F. White; treasurer, C. E. Stoeckle; directors, C. A. Johnson, B. L. Wenke, L. S. Harter, F. G. Newkirk, E. Corsepius, Walter Huebner, B. F. Drollinger. A number of the small towns in the vicinity of Ft. Madison are well represented in the membership.

Pittsburgh Club Active—The Automobile Club of Pittsburgh, Pa., is getting active this spring, following its big banquet at the Hotel Schenley a few weeks ago. The club lately has sent out 1,000 letters to owners in Greater Pittsburgh whom it desires to have as members. It is expected that this mailing will bring a large increase in the membership of the club. Licenses are being taken out by the hundreds in this city, and the many things that are coming up in the way of protection to the interests of owners demand that Pittsburgh owners join some well-organized protective association.



PENN Crew Has Land and Water Barges—A special land barge for conveying the Penn crew to and from the water is shown above. Yale will have to go some to beat this crew. Coach Wright has the Pennsylvania oarsmen out twice a day, at 7 in the morning and at 5 in the afternoon. The varsity crew is shaping rapidly into a formidable organization. The crew will be kept steadily at work in all kinds of weather, fair or foul. That the crew is well taken care of is evidenced by this special land barge for its particular use.



Among the Makers and Dealers



Quite a contrast—An Overland motor car and ancient Hindu idols on the Island of Bali, near Sumatra, Dutch East Indies

MUSKEGON Company Adds—Additions to the plant of the Piston Ring Co., Muskegon, Mich., will be made to enable production being doubled. At the present time it is said the company turns out an average of 27,000 piston ring castings a day. It is expected that when the increased production facilities will be ready it will be possible to make at least 50,000 piston rings a day.

Autocar Is Adding—The Autocar Co., Ardmore, Pa., is to erect another factory directly opposite the present road testing plant. This new building will have 85,000 square feet of floor space and will be devoted entirely to the manufacture and painting of Autocar bodies and the final assembly of body and chassis.

Will Accept Cash Settlement—The Imperial Automobile Co., Jackson, Wis., has decided to accept \$50,000 in cash to settle its claim against the defunct Milwaukee Motor Co., and it is believed that a speedy settlement of the affairs of the bankrupt concern, once a large manufacturer of motor car engines, now will be effected. Shortly after the Milwaukee company went into bankruptcy the Imperial company filed suits claiming an aggregate of \$331,711 damages.

Columbia Production Increased—The plant of the Columbia Axle Co., Cleveland, O., has been enlarged. Seventy-five per cent more floor space has been added and with the new equipment installed the production of Columbia axles immediately jumps 100 per cent over the former capacity. An interesting feature of the new factory building is a sound-proof testing room. Specially constructed walls shut out all sound from this room. The floors and testing racks are of concrete with very solid foundations. Each axle before it receives the final O. K. is tested in this room under the supervision of trained inspectors. The axle is connected to a powerful electric motor and the slightest noise is instantly detected and corrected before the axle is shipped.

Peorias Get Show Rebates—At the second annual banquet last week of the Peoria Automobile and Accessories Dealers' Association, Peoria, Ill., rebates were paid to the forty-three exhibitors who had booths at the annual show in February. Each ex-

hibitor was paid back his entire deposit for space, the very large attendance making this possible. A balance of \$750 was voted for the cause of good roads.

Remy Employees' School—The school of the Remy Electric Co., Anderson, Ind., operated in connection with the Anderson public schools, and 385 are taking the course. These men are fitting themselves to be more valuable to the company, and their only expense is the wholesale cost of the text books they use. The Remy company is a sincere supporter of plant welfare work.

N. Y. Eisemann Station Taken Over—The New York office of the Eisemann Magneto Co. has been discontinued, the Auto Electric Service Co. taking over the stock, machines, etc. The latter company will continue at the same address and will act as the Eisemann service station for New York proper, also Long Island City, Bronx, and Westchester and Rockland counties in New York state, and Bergen, Hudson, Essex and Union counties in New Jersey.

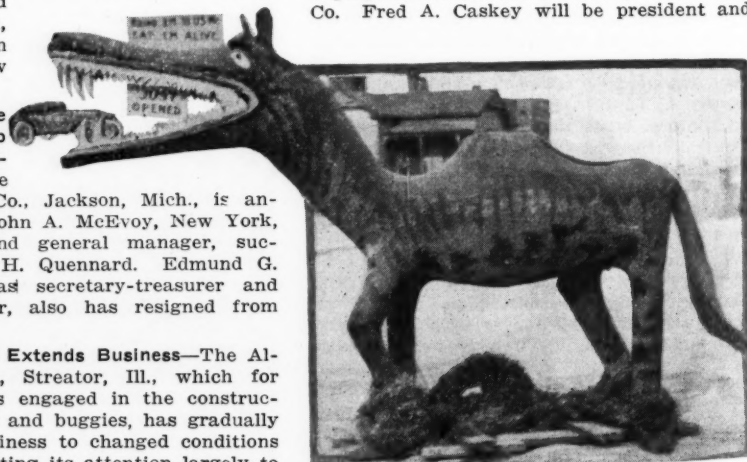
Reorganize American Top Co.—The reorganization of the American Top Co., Jackson, Mich., is announced, with John A. McEvoy, New York, as president and general manager, succeeding George H. Quennard. Edmund G. Odette, who was secretary-treasurer and general manager, also has resigned from the company.

Wagon Maker Extends Business—The Alliance Mfg. Co., Streator, Ill., which for many years was engaged in the construction of wagons and buggies, has gradually adjusted its business to changed conditions and now is devoting its attention largely to commercial truck bodies. As this business has reached a large scale, it has been decided to add motor hearses. The Alliance company will manufacture the bodies and the Barley company, also of Streator, will furnish the chassis. The waste or by-product of the Alliance company is being utilized in making wagon boxes which are

contracted for by Montgomery Ward & Co., Chicago. This business amounts to a high figure in the course of a year.

Reorganized to Make Tractors—The Opsato Motor Plow Co., organized at Eau Claire, Wis., in the spring of 1915 to manufacture a gas plow and general utility farm tractor, has been reorganized as the Eau Claire Mfg. Co., and is now ready to begin a large production. The company has completed its plant and installed the equipment. Officers have been elected as follows: President, R. B. Gillette; vice-president, J. P. Norrish; secretary and chief engineer, M. S. Opsato; treasurer, Charles Keller.

New Company in Buckeye State—Steps have been taken at Marietta, O., to organize a \$100,000 corporation for the purpose of manufacturing motor car locks, switches and other accessories. The plan is to occupy the plant of the Galvan Mfg. Co., located at East Norwood, near Marietta. It is proposed to call the concern the C-D Mfg. Co. Fred A. Caskey will be president and



THE Toltelk Cow—Papier mache beast used for advertising the Toltelk Motor Co., El Paso, Tex. It stands in the center of the show room and gets along admirably with the Dort and Paige cars on display there. A cut of this unusual critter is used for trade mark.

secretary; G. F. Dupree, Jr., vice-president and salesmanager, and O. D. McPherson, treasurer and auditor. F. D. Kunkle will be chief engineer.

Beechler Moves Up—The Timken-Detroit Axle Co., Detroit, Mich., has promoted R. G. Beechler, who was chief engineer of its metal products branch, to the position of works manager.

Owosso Company to Lease Plant?—The Owosso Carriage & Sleigh Co., Owosso, Mich., is said to be negotiating for the lease or sale of its plant to an Indiana concern making motor car tops.

Represents McLean at Mansfield—The Buchan Auto Supply Co., Mansfield, O., has opened with a full line of tires and accessories, acting as distributor for the McLean Tire & Rubber Co. G. L. Buchan is manager.

Shakespeare Plans Addition—Plans are being made by William Shakespeare, Kalamazoo, Mich., manufacturer of the Shakespeare carbureter, to enlarge his factory in order to be able to turn out 20,000 carbureters, beginning next July.

Paige Rifle Corps Planned—The Paige-Detroit Motor Car Co., Detroit, Mich., has decided to organize a rifle corps among its factory workers, to be known as the Paige rifle corps. This is in line with the ideas of the president, Harry M. Jewett, about preparedness and good citizenship.

Briscoe to Use Fuller Plant—The Briscoe Motor Corp., Jackson, Mich., will take possession next week of the three-story plant of the Fuller Buggy Co. This will greatly relieve the congestion at the Briscoe works, which have been in need of more room for some time.

Body Company Gets Brewery—The Auto Body Co., Lansing, Mich., has leased the plant of the Lansing Brewery Co. Negotiations have been pending for some time and it is said that the deal was completed principally because of the state-wide prohibition movement which is making it difficult, so it is claimed, for many brewing companies to do a profitable business.

Briscoe Adds Factory Buildings—Construction work on the large additions to the Briscoe Motor Corp., Jackson, Mich., is progressing rapidly. The contractors are endeavoring to hang up a new record for actual time in completing the two new Briscoe buildings. They promised to turn over the finished buildings to the production manager within sixty days from day ground was broken. And this is no child's play when it is recalled that one building, which will be used exclusively for the building of motors, is to be 260 feet long by 60 feet wide,

and two stories high. The second building, a motor testing room, is 100 feet one way and 40 feet the other.

Pellet Magneto Changes Name—Pellet's Magneto Exchange, 1606 Michigan avenue, Chicago, was recently incorporated as the Pellet Magneto Co.

Longwell to Orient—Walter T. Longwell will sail April 22 for the Orient on a business investigation trip for the Maxwell Motor Co., Japan, China, India, Java, etc., will be visited, and if the war in Europe is over by next February, then the trip will be continued to Europe via Egypt.

Lemke Electric Supplies Bijur—The Lemke Electric Co., Milwaukee, Wis., has been appointed official service and supply station for the Bijur Motor Lighting Co. The Lemke company also is official station for the Bosch, Simms and Mea Magneto companies; Splittdorf Electric Co.; Rushmore Dynamo Works and Gray & Davis, Inc., and acts as official distributors for Wisconsin and northern Michigan.

Adamson Company Adding—The Adamson Mfg. Co., East Palestine, O., is just starting work on an addition to its plant to be 50 by 150 feet and three stories high, total 22,500 square feet of floor space. The new building will be of brick and glass construction and will be used for increased production of Adamson vulcanizers and new patented devices of interest to the industry. Work will be pushed so that the new plant can be occupied some time in June.

No Chalmers Station at La Crosse—The report from La Crosse, Wis., that the Chalmers Motor Co., Detroit, Mich., intended to make this point a large distributing center and would erect a \$150,000 branch house, assembling shop, etc., is denied by authority from the factory headquarters. The report stated that a building 400 by 60 feet, with a wing 40 by 60 feet, would be erected at once. La Crosse contractors who attempted to make a bid for the erection job were informed that the Chalmers company contemplated no such construction.

Reorganize Frayer Wheel—The Phelps Manufacturing Co., Columbus, O., incorporated with a capital of \$100,000 to manufacture wire wheels for motor cars, is a reorganization of the F. & H. Wire Wheel Co., formerly of Columbus but later of Springfield, O. The concern was founded by Lee Frayer and was at first called the Frayer Demountable Wire Wheel Co. Later it was called the F. & H. Wire Wheel Co. and moved to the Bauer Bros. plant at Springfield. The plant will be established in the former Barndt & Johnson Auto Co.'s plant

on South High street, Columbus. New officers will be elected within the coming week.

Tibbitts 19 Years with Goodyear—On April 7 E. C. Tibbitts finished his nineteenth year as advertising manager for the B. F. Goodrich Co., Akron, O.

New Concern at Jackson—A new carbureter and other motor devices are to be made by a new concern at Jackson, Mich., in which one of those principally interested is David E. Buick, who started the Buick Motor Co., it is said.

Night School for Briscoe Men—A night school for its shop workers has been started by the Briscoe Motor Corp., Jackson, Mich. Groups of fifty workers at a time will attend and it is expected that the course will eventually make the men more efficient and enable them to get better pay.

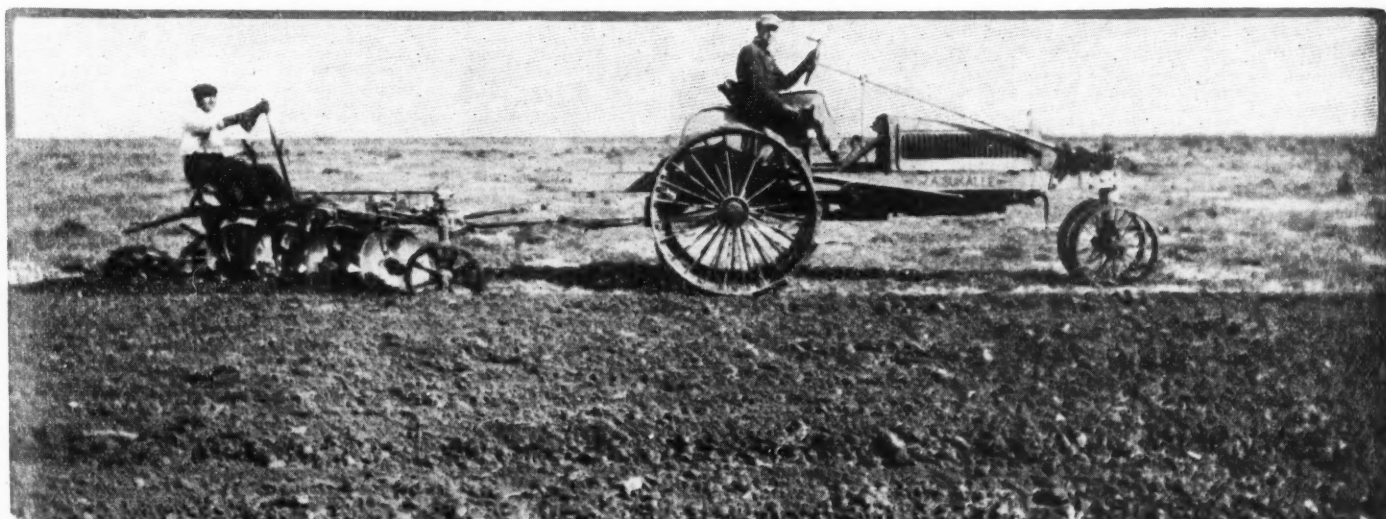
Johnson Manages Detroit Gibney—Following the resignation of Detroit branch manager H. L. Winter of the Gibney Tire & Rubber Co., O. S. Johnson has been appointed to manage the Gibney interests there. Mr. Johnson was formerly a district manager for the United States Tire Co.

Schultz Goes to Jeffery—William G. Schultz, for 6 years associated with the Reeke-Osmond Motor Car Co., Milwaukee, Wis., representing the Jeffery, has resigned to resume a connection as special traveling representative of the Thomas B. Jeffery Co., Kenosha, Wis. Mr. Schultz was with the Jeffery company before being transferred to the Milwaukee agency.

No Interruption for Silvox—The Silvox Co., N. Y., manufacturer of the Bethlehem five-point spark plug, announces that in spite of the damage caused to its factory by fire there will be no interruption to business. Arrangements were made with a neighboring factory for the continuance of the manufacturing.

Badger to Make Commercial Bodies—The Badger Auto Body Co., Milwaukee, Wis., the incorporation of which was recently noted, is establishing a large shop at Lisbon avenue and the Milwaukee road tracks, and will devote its efforts exclusively to the production of delivery bodies for motor cars, specializing in styles adapted to Ford chassis.

Reorganize Fender Company—At a meeting of the stockholders of the Welton Automobile Fender Co., Columbus, O., a complete reorganization was effected. The new corporation is known as the Auto Cushion Fender Co. and the capital stock is \$20,000, of which \$17,500 has been issued. Dr. John M. Thomas was made president and Dr. Fred Fletcher secretary-treasurer. Plans



W. A. Sukalle, Casa Grande, Ariz., rebuilds old Winton touring car into tractor and uses it to cultivate 640 acre ranch

were made for a vigorous selling campaign of the fender, which is made under contract by the Columbus Auto Brass Co. Several new models of fenders will soon be placed on the market.

Hess Firestone Cleveland Manager—J. D. Hess, Jr., has been appointed manager of the Cleveland, O., branch of the Firestone Tire and Rubber Co. Mr. Hess spent 3 years as salesman in the Detroit branch of the company.

Ford Factory Boosts Town's Values—According to the annual report of city assessor J. Reaume, of Ford, Ont., the property value of Ford City has increased from \$700,000 to \$1,112,433 since the previous assessment count was made. This is principally due to the extensions of the Ford Motor Co. of Canada, Ltd.

Canadian Chalmers Leases Plant—The plant of the Tate Electric Car Co., Ford, Ont., has been leased for a period of 5 years by the recently organized Chalmers Motor Co. of Canada. This will make it possible for this concern to start actual operations several months sooner than would have been possible awaiting the erection of a plant, as has been contemplated.

North East Gotham Branch—The North East Electric Co., Rochester N. Y., has opened a branch in New York City. This branch will be under the management of H. W. Doebert. A full stock of repair parts on all models of North East starting and lighting equipment will be carried.

Final R-C-H Dividend—The Security Trust Co., trustee for the R-C-H Corp., Detroit, Mich., which went into bankruptcy in October, 1912, with debts of \$1,800,000, has announced that a final dividend of about 7½ per cent is ready to be mailed to creditors. This dividend is equal to about \$37,000 and brings up the total paid to secured claims to \$194,000, and the total of the amount paid to unsecured claims to \$211,000, since November, 1913.

Lower Rate on Parts—Material reductions in the freight rates on pressed steel frames and other motor car parts from Milwaukee to southern points are in prospect as the result of the appeal of the Dorris Motor Car



PROGRESSIVE Packard Assembly—The progressive system of assembly has been adopted by the Packard Motor Car Co., Detroit, Mich., in its truck department. The accompanying illustration shows how the upper half of an aluminum crankcase starts in, bare, at one end of a 300-foot track and, gathering parts as its travels, comes out the other a complete truck motor. The view is taken from the finish end of the line. The track is made of 1-inch steel tubing, elevated on cast-iron standards, or trestles, 23 inches high. The motors ride on special castors, or skates, and teams of workmen apply the various parts. The one break in the track occurs where ten swivel jacks are located. A motor secured in one of these jacks then can be turned to any degree of the arc of a circle to allow for assembly operations in out-of-the-way locations.

Co., St. Louis, Mo., to the Interstate Commerce Commission. The A. O. Smith Co., Milwaukee, Wis., recently shipped 202 gear frame side bars, loose, weighing 23,000 pounds, from North Milwaukee to St. Louis.

The first class rate of 49.3 cents per 100 pounds was charged. The commission held the rate to be unreasonable and changed the rate to third class, amounting to 31.5 cents per 100 pounds.

Ardmore, Okla.—Ardmore Auto Co.; capital stock, \$10,000; incorporators, C. E. Sykes, D. C. Fitzgerald, C. F. Adams.

Adrian, Mich.—United Electrical Mfg. Co.; capital stock, \$50,000; to make electric horns and other electrical goods; incorporators, B. D. Hayes, K. F. Wagner, Walter Haley, E. J. Wagner.

Bryan, O.—Bryan Motor Service Co.; capital stock, \$40,000.

Buffalo, N. Y.—Safety First Auto Parts Co.; capital stock, \$25,000; incorporators, P. U. Daniel, G. H. Hutchings and Fred S. Jackson.

Canton, O.—Young Auto Supply Co.; capital stock, \$20,000; to deal in motor car supplies; incorporators, G. A. Young, H. E. Young, Carrie W. Young, W. S. Shester, J. McIlwain.

Cleveland, O.—Ohio Auto Sales Co.; to deal in motor cars and supplies; capital stock, \$10,000; incorporators, H. L. Lance, H. D. Laurence, W. C. Criswell, F. W. Lance and Nettie Koh.

Columbus, O.—Middle West Refining Co.; capital stock, \$50,000; incorporators, R. E. Westfall, Smith W. Bennett, James Judge, N. Bales and H. Shetler.

Columbus, O.—Phelps Mfg. Co.; to manufacture wire wheels; capital stock, \$100,000; incorporators, H. C. Phelps, G. R. Hedges, Hugh Huntington, H. R. Tingley and S. A. Hoover.

Cleveland, O.—Cleveland Glide Motor Car Co.; to deal in motor cars and supplies; capital stock, \$10,000; incorporators, Elmer K. Reymier, Emma K. Reymier, Ida B. Emerich, H. E. Emerich, A. W. Emerich.

Cleveland, O.—Electric Welding Co.; to do all kinds of welding and motor car repair work; capital stock, \$10,000; incorporators, K. German, James H. Palmer, S. Chester Crobaugh, A. R. Corlett and M. Y. Yost.

Corbin, Ky.—Corbin Auto & Delivery Co.; capital stock, \$1,000; incorporators, W. H. Chandler, Q. A. Miles and R. O. Williams.

Chicago—Home Mfg. Co.; to deal in all kinds of motors, engines, searchlights, etc.; capital stock, \$25,000; incorporators, B. F. Bartel, L. D. Jacobs, W. F. Heineman.

Chicago—Quick Tire Service Co.; capital stock, \$5,000; to manufacture and deal in and repair motor cars and accessories; incorporators, T. P. Edwards, A. F. Miller and E. F. Miller.

Recent Incorporations

Denver, Colo.—Peters, Tucker, Hay Rubber Co.; to sell tires; capital stock, \$10,000; incorporators, Harry G. Peters, E. M. Tucker, R. E. Hay.

Davenport, Ia.—Keeler Taxicab Co.; capital stock, \$25,000.

Detroit, Mich.—Detroit Accessories; capital stock, \$25,000.

Dayton, O.—Dayton Body Co.; to manufacture motor car bodies; capital stock, \$100,000; incorporators, John Dudley Artz, Chas. M. Feldman, Wm. G. Melle, Lula M. Sammons, W. M. Osterday.

Detroit, Mich.—Droford Starter Co.; capital stock, \$5,000; to make and deal in motor car accessories; incorporators, E. W. Mulford, L. A. Mulford and F. H. Tighe.

Dayton, O.—Interstate Motor Sales Co.; capital stock, \$10,000; incorporators, W. C. Littleton, O. B. Lehman, H. N. Filbert, H. H. Kellenberger and H. F. Nolan.

Detroit, Mich.—U. S. Auto Supply Stores Co.; capital stock, \$50,000; incorporators, A. M. Symonds, O. W. Konzelman and Bert Servis.

Detroit, Mich.—Steel Treating Equipment Co.; capital stock, \$10,000; incorporators, G. C. Nixon, Ida C. Nixon, William Heer, Jr.

Davenport, Ia.—Motor Express Co.; capital stock, \$10,000; incorporators, S. M. Gustine, C. S. Blanchard and F. R. Blanchard.

Kankakee, Ill.—Chiniquy & Parker; to manufacture the Kankakee motor car; capital stock, \$25,000; incorporators, O. L. Chiniquy, R. L. Chiniquy and R. E. Parker.

Kansas, O.—Inter-City Garage & Supply Co.; to operate a garage and deal in accessories; capital stock, \$10,000; incorporators, L. Jones, C. W.

Sprout, Amelia Jones, E. A. Shuman and Chas. Schuster.

Knoxville, Tenn.—Kuhlman Motor Sales Co.; capital stock, \$2,000; incorporators, W. D. Kuhlman, J. B. Caldwell, J. W. Low, D. M. Chambliss and E. W. Kuhlman.

Louisville, Ky.—White Tire Co.; capital stock, \$10,000; incorporators, Charles Dobbs, B. H. Plaskett and Emil Van Allman.

Louisville, Ky.—Winklemann-Schade Motors Co.; capital stock, \$20,000; incorporators, W. F. Winklemann, Walther Schade and Bessie Schade.

Mt. Vernon, Ind.—Lichtenberger Sales Co.; to buy and sell motor cars and accessories; capital stock, \$6,500; incorporators, E. S. Lichtenberger, H. S. Lichtenberger, J. A. Sprowl, J. O. Sprowl, C. O. Sprowl.

Minneapolis, Minn.—E. R. Boutell, Inc.; capital stock, \$50,000; incorporators, E. R. Boutell, J. M. Boutell and M. B. Mitchell.

Minneapolis, Minn.—Nonpareil Oil Co.; capital stock, \$50,000; incorporators, Harry Loomis, Ross Larson, H. P. Keller and H. L. Dunn.

Milwaukee, Wis.—Kero Carburetor Co., to manufacture fuel vaporizing devices for internal combustion engines; capital stock, \$15,000; incorporators, W. G. Gehr, John J. McJeskey and R. N. Van Doren.

Olympia, Wash.—Mitchell Motor & Service Co.; capital stock, \$10,000; incorporators, J. M. Osmond and Martin Korstad.

Orlando, Fla.—United States Shock Absorber Co.; capital stock, \$100,000.

Richmond, Ind.—Laurel Motor Car Co.; capital stock, \$6,000; incorporators, Charles E. Hays, Harry Gates, J. H. Gates.

Racine, Wis.—Standard Gas Saver Co., to manufacture economizing devices and appliances for motor cars, trucks, etc.; incorporators, M. E. Walker, C. V. McAvoy and H. R. Simms.

Seattle, Wash.—Mitchell Motor & Service Co.; capital stock, \$10,000; incorporators, J. M. Osmond and Martin Korstad.

Seattle, Wash.—Clark Garage & Repair Shop; capital stock, \$4,000; incorporators, J. H. Clark, Hans Hanson, J. H. Gordon.

Toledo, O.—State Motor Sales Co.; to deal in motor cars; capital stock, \$60,000; incorporators, Elton Gauntlett, T. E. Wyatt, H. W. Nauts, H. M. Eager, U. G. Denman.